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1 Executive summary

AEMO has prepared this detailed design for a gas supply hub at Wallumbilla, Queensland, at the request of the Council of Australian Governments’ (COAG) Standing Council on Energy and Resources (SCER). The report presents the detailed market design for a brokerage hub model to be operated by AEMO, prepared in consultation with the gas industry.

The impetus for an upstream trading hub comes as Queensland’s gas sector faces a period of unprecedented change, driven by the development of a significant liquefied natural gas (LNG) export program. Queensland’s gas demand is expected to increase from 240PJ each year in 2012 to over 1,500 PJ each year by 2016.

The significance of this growth has been emphasised in a number of recent industry publications, including the Australian Government’s draft Energy White Paper (December 2011) and the Queensland Gas Market Review (October 2012).

If approved by SCER, the establishment of a supply hub at Wallumbilla would be the next significant step in COAG-led gas market reforms aimed at increasing transparency, competition and reliability of supply, including the introduction of the Gas Market Bulletin Board (GBB) and Short-Term Trading Market (STTM).

International gas markets have introduced spot gas exchanges similar to the brokerage hub to enhance trading liquidity. This has developed gradually in North America and Europe through appropriate policy settings and the evolution of trading markets to meet participant needs. While Australia’s gas markets operate on a smaller scale than these markets, AEMO expects implementation of a supply hub at Wallumbilla to bring similar long-term benefits. These benefits are expected to further promote achievement of the National Gas Objective and Gas Market Leaders Group's gas market development principles, and include:

- enhancing transparency of gas trading;
- strengthening participants’ short-term ability to allocate and price gas efficiently;
- setting a reference price that would support the evolution of financial products to manage portfolio risk;
- providing a generic and flexible national framework for a supply hub that can evolve with industry needs and be applied at any location through the introduction of a new product at a new location; and
- supporting the efficient trade and movement of gas between regions.

Detailed design of the Wallumbilla supply hub

Wallumbilla is the most suitable location in Queensland for the establishment of the gas supply hub. It acts as the interconnection point between pipelines that deliver gas from major gas fields and the connection point for three major pipelines that deliver gas to downstream gas markets and end-users.

The brokerage hub would facilitate the matching and clearing of trades between buyers and sellers of gas at three pipeline receipt point locations. At market-start, AEMO would offer two products for participants to trade. These are a ‘day-ahead’ product and ‘a balance-of-day’ product. The standard delivery period (term) for the day-ahead product is a single gas day. The ‘balance-of-day’ product will enable parties to make adjustments to their portfolio closer to real-time and to manage imbalances within the gas day.

AEMO also intends to develop a month-ahead (forward) product for use at market-start. Forward-dated products could assist participants manage their gas portfolio in response to outages and scheduled maintenance while providing an initial forward-looking price for participants. The completion of this product by market-start will depend on AEMO having sufficient time to work with the gas industry to develop any specific terms and conditions for the product.
AEMO intends to use a low-cost, web-based trading platform to match buyers and sellers at the hub. By entering into a transaction on the exchange, the seller would commit to supply gas at the trading location and the buyer would agree to receipt gas at that trading location. The proposed platform is used in existing international gas and power trading markets and can support any number of standardised commodity products or services. The platform would be provided by a third party vendor and supported by existing AEMO gas and power settlements and prudential systems, reducing the implementation and ongoing cost to industry.

Participants will be responsible for arranging the delivery of gas at the hub using their existing contractual supply and transportation agreements. Independent of the market, the pipeline operator will schedule the delivery of gas at the trading location based on nominations submitted by participants along with all other bilateral nominations. A participant will be required to pay a fixed amount of compensation to its counterpart if it fails to deliver or receipt gas in accordance with its transaction obligations.

A centralised settlement model is proposed for the gas supply hub, aimed at supporting liquidity by minimising the credit risk to participants, minimising the barriers to entry for new participants and leveraging settlement processes in other markets operated by AEMO to reduce implementation costs. The centralised settlement model will involve the collation of transactional information from the trading system and delivery information from participants, the calculation of settlement amounts, and the issue of statements to participants. Participants will be able to choose between settling any variances to their delivery obligations bilaterally with their counterpart, or to bring a variance to the market where it will be conveniently settled as part of the regular billing process for the hub transactions.

**Capacity trading**

Development of a detailed design for the Wallumbilla hub has also provided an opportunity to examine whether improving the ability to trade pipeline capacity between shippers could facilitate greater participation at the hub by new entrants, producers, retailers, generators and traders. For example, capacity trading could enable these new participants to trade gas at the hub by providing an additional option with which to access transport to move gas around the interconnected gas markets of Eastern Australia.

AEMO will introduce a mechanism to list available capacity at market-start using a bulletin board approach. The development of standardised terms and conditions for secondary trading in conjunction with a listed capacity product will be explored for introduction at a later date. AEMO would develop all of the above products in consultation with the gas industry.

AEMO, with support from the gas industry, will further consider the design of a voluntary shipper-to-shipper capacity trading mechanism that could support liquidity at the hub to encourage further trade between regions. This work aims to complement SCER’s current review of capacity trading. A market-driven pipeline capacity trading mechanism could improve incentives for pipeline operators to offer innovative services to facilitate trade and improve utilisation, where possible, of transmission systems.

**Legislative framework and Exchange Rules**

The establishment and operation of the supply hub would be facilitated by amendments to the National Gas Law (NGL), National Gas Rules (NGR) and National Gas Regulations (Regulations). Operation of the supply hub would be included as one of AEMO’s statutory functions in the NGL, bringing that role within the statutory liability framework applicable to AEMO’s other markets. AEMO proposes that the hub be defined broadly enough to provide for the continued development of the exchange to accommodate industry demand for additional products, locations and services.

AEMO has developed an outline for a set of Exchange Rules, which would be authorised by the NGL and NGR and would contain the majority of participant obligations and AEMO functions. The Exchange Rules constitute a membership agreement, through which parties gain the right to
participate in the exchange, taking effect as a multilateral agreement between AEMO and all participants. Each new participant would accede to the membership agreement, agreeing to be bound by the rules and associated terms and conditions. Participants will be allowed to trade after posting collateral. The flexible change process for the Exchange Rules will support continued evolution of product design to meet industry needs.

AEMO will operate the exchange on the basis that its costs are fully recovered through fees payable by hub participants, with strictly limited liability.

Cost-benefit assessment

AEMO’s cost-benefit assessment shows that the proposed detailed design could be implemented at low cost (by industry standards). The total implementation cost for AEMO is estimated at $1.4-$1.7 million, in addition to ongoing operational costs (estimated at $570,000 per annum to cover ongoing software licensing and business support). Given that some participants can leverage of existing systems, potential costs for industry participants would vary at market-start.

Despite the recognised limitations with the brokerage model design, AEMO views the proposed introduction of the model as a positive step toward building a more liquid and secure gas industry. Over time, natural evolution of trading standards and the further development of services, forward and capacity products, would provide participants new options for managing their gas portfolio while incurring low transaction costs. This would lessen the barrier to entry for smaller participants and reduce their cost of doing business. It would, in turn, facilitate greater market entry and participation, increasing liquidity and efficiency improvements, while potentially lowering costs to consumers.

Benefits associated with the proposed detailed design include:

- centralised settlement and credit risk management;
- enhanced transparency and contract standardisation;
- bringing together potential buyers and sellers and promoting competition between them; and
- publishing a daily average price that can develop into a reference price for industry.

Recommendations

To implement the brokerage model as outlined in this detailed design report, AEMO seeks SCER’s approval of the following recommendations. AEMO recommends that the SCER:

- Task AEMO to implement the proposed detailed design for a brokerage hub at Wallumbilla;
- Require AEMO to further develop a voluntary shipper-to-shipper capacity trading mechanism to complement SCER’s current review of capacity trading and design a forward product to list on the exchange; and
- Require these recommendations to be delivered by March 2014.
2 Introduction

This report presents AEMO’s proposed detailed design for a brokerage gas supply hub at Wallumbilla in Queensland, as requested by the Standing Committee on Energy and Resources (SCER) at its June 2012 meeting. It follows SCER’s previous request, at its December 2011 meeting, for AEMO to prepare a cost and scoping report. SCER’s June decision was based on consideration of this cost and scoping report.

AEMO has developed this detailed design in close consultation with the Gas Supply Hub Reference Group (GSHRG), which is comprised of a range of industry participants including gas shippers, producers, retailers, pipeline owners as well as electricity generators and investment banks. Appendix 1 provides a complete list of GSHRG participants.

The cost and scoping report presented four alternative market design options. These options were a brokerage hub, a brokerage model with hub services, a mini-single trading hub and a single trading zone. Based on a set of criteria, including transparency, competition and liquidity, AEMO suggested a staged approach to eventual implementation of a ‘single trading zone’ at Wallumbilla.

The cost and scoping report presented two alternative paths to reaching a single trading zone within five years. Of these two paths, SCER supported a path comprising the development of a detailed design and implementation plan for establishment of a brokerage hub (in early 2014), followed by a review of hub services in 2015, with SCER’s in-principle support to consider a transition to a single trading zone after 2015 (subject to a cost-benefit assessment). This approach was developed with a view to facilitating further achievement of the National Gas Objective, while promoting the Gas Market Leaders Group’s principles for gas market development.

Australia’s evolving gas markets

The Queensland gas industry has experienced unprecedented growth in recent years, due to the development of coal seam gas (CSG) as an input to the liquefied natural gas (LNG) export industry. Australia is now the world’s fifth-largest exporter of LNG according to the International Energy Agency and, by 2020, is expected to supply half the world’s LNG production growth.

The 2012 Queensland Gas Market Review (the Review) places current Queensland gas consumption figures at around 240 PJ each year, with eastern Australia gas market consumption at around 718 PJ each year. According to the Review, the dominant force in the Queensland gas market in the near future is growth in demand for export LNG, with demand for six LNG trains expected by 2015–16 and a further two proposed trains by 2020–21 (taking projected gas demand to around 1770 PJ and 2280 PJ per year respectively). Based on these projections, LNG exports from Queensland are likely to exceed total domestic gas demand from Eastern and South Eastern Australia by 2016.

The sensitivity of domestic gas supply to the development of LNG trains, according to the Review’s final report, has resulted in a short supply of new contracts in Queensland before and after 2015. Further, in the twelve months to June 2012, customers seeking a new domestic supply contract for gas beyond 2015 reported continued lack of access to basic market information to inform forward contracting. Combined with the lack of liquidity in Queensland’s gas industry, the Review notes market uncertainty and energy security challenges stemming from the short supply of new contracts.

While currently insulated from international markets, Australian gas markets are soon expected to experience further commercial interconnection to international markets with the increased export of LNG. With continued convergence between the gas and electricity markets, participants are likely to trade the fuel spread and encourage development of products to manage the associated risks.

A supply hub at Wallumbilla

Wallumbilla plays a key role as a major transit centre for natural gas in Eastern Australia, with existing trade and significant infrastructure connecting multiple markets. The Roma-Brisbane Pipeline (RBP), Queensland Gas Pipeline (QGP) and the South West Queensland Pipeline...
(SWQP) connect at Wallumbilla, providing a transit point between markets in Queensland, South Australia, NSW and Victoria.

Current physical capacity on each pipeline, as indicated by the Bulletin Board in October 2012, is 219 TJ/day for the RBP, 145 TJ/day for the QGP and 404 TJ/day for the SWQP. The SWQP is currently being augmented to increase its bi-directional flow from 2014. Capacity for the pipelines flowing entirely from Wallumbilla are likely to be reduced.

The Wallumbilla region also has storage and connections from numerous coal seam gas fields, which (as noted in the Australian Energy Regulator’s 2011 State of the Market Report) supply over 20% of domestic demand and are also likely to supply future export demand from Gladstone.

Current trading arrangements at Wallumbilla do not provide a transparent price signal or point of exchange for buyers or sellers to value gas within a gas day. Transactions can take up to six months or longer to complete, with limited flexibility for short-term trading and transportation within shippers’ contract terms and conditions. Members of the GSHRG highlighted this and other issues with current short-term trading arrangements at Wallumbilla, including high transaction costs.

A transparent price and trading point at Wallumbilla would help provide a basis for valuing and transacting gas within a day. As the Australian Government noted in its December 2011 draft Energy White Paper, a supply hub has the potential to balance gas supplies at least cost, enabling market participants to better manage the financial risk associated with exposure to variable gas prices. It would also increase overall participation in gas markets by attracting large users (such as LNG plants, industrial users and gas-powered generators (GPG)).

**Liquid energy markets**

Liquidity is a key determinant of well-functioning, competitive energy markets. It is commonly defined as the ability to quickly buy or sell a desired commodity or financial instrument without causing a significant change in its price or incurring significant transaction costs. A liquid market has a large number of buyers and sellers willing to transact at all times.

As noted in the UK energy market regulator’s (Ofgem) 2009 review of *Liquidity in the Great Britain wholesale energy markets*, liquidity can have the following positive impact on energy markets:

- facilitation of new entry in generation and supply by enabling new entrants to buy and sell electricity to match their output and customer base with confidence;
- less potential for market manipulation;
- provision of a wider range of products and counterparties for participants to hedge their risk exposure;
- increased confidence in traded prices (a large number of gas and electricity supply contracts between buyers and sellers are referenced to market prices);
- participation of non-vertically integrated new entrants on the same terms as vertically-integrated incumbent firms; and,
- improved management of long-term risk with long-term price signals about future market development, which inform investment decisions and promote long-term security of supply.

**Stakeholder engagement**

AEMO has worked closely with the gas industry (through the GSHRG) throughout the development of the detailed design. Membership of this group has steadily grown in diversity to include industry parties not currently involved in gas trading at Wallumbilla but interested in the development of the supply hub, including potential future financial traders. AEMO has also discussed the suitability of the supply hub concept to support derivative markets and cross fuel risk management products with the Australian Securities Exchange and has engaged with the Energy Users’ Association of Australia and the National Generators’ Forum to outline the design benefits and limitations.
AEMO has received a number of letters from participants in support of the policy direction and the development of the supply hub, which broadly support the approach, direction and outcomes so far while recognising the limitations of the design that may limit or restrict liquidity in the first year or two. These letters will remain confidential (at the request of participants) and have been presented to SCER as a confidential attachment.

**Report structure**

This report is structured as follows. Section 3 presents an overview of AEMO’s detailed design for a brokerage supply hub at Wallumbilla. Section 4 discusses capacity trading, while section 5 presents a legal and regulatory overview. Section 6 presents the outcomes of AEMO’s cost-benefit assessment and the report recommendations are included at section 7.

Additional detail is attached in a set of appendices.
3. **Detailed market design: a brokerage hub at Wallumbilla**

This section of the report provides an overview of the proposed detailed design for the brokerage supply hub at Wallumbilla. It covers trading, delivery, settlement and credit risk management, participant registration, market conduct market information and dispute resolution. Further detail about each of these is provided in Appendix 2.

### 3.1 The brokerage model

The brokerage hub would facilitate the matching and clearing of trades between buyers and sellers of gas at three pipeline receipt point locations through a web-based exchange platform. These receipt point locations would be at the RBP, QGP and SWQP. At market-start, AEMO would offer two products for participants to trade. These are a ‘day-ahead’ product and a ‘balance-of-day’ product. The standard delivery period (term) for the day-ahead product is a single gas day, while the ‘balance-of-day’ product is for the delivery of gas from the transaction time to the end of the gas day. The ‘balance-of-day’ product would enable parties to adjust their portfolio closer to real-time and to manage imbalances within the gas day.

AEMO also intends to develop two additional products for market-start, in consultation with the gas industry. These are:

- a monthly forward product, which could manage the risk of outages and maintenance schedules while providing an initial forward-looking price for participants. The completion of this product by market-start will depend on AEMO having sufficient time to work with the gas industry to develop any specific terms and conditions for the product; and
- a mechanism for trading capacity that allows participants to advertise their trading interest (bulletin board approach). The development of standardised terms and conditions for secondary trading (in conjunction with a listed capacity product) will be explored for introduction at a later date.

At Wallumbilla, existing buyers of gas are entitled to take gas away from the hub on a transmission pipeline for which they have an existing Gas Transportation Agreement (GTA). The diversity of contract positions and the number of participants at Wallumbilla creates a natural point of trade. The brokerage model is designed to be implemented at a major supply centre such as Wallumbilla. A trading product would be created at the RBP, QGP and SWQP trading locations (nodes) where title of gas would transfer at the delivery point specified for each product. Similarly, shippers could trade gas between each node with the relevant access to capacity, compression and services that enable transit of gas between trading nodes.

Implementation of the brokerage model avoids the need to change infrastructure, operations or contracts. Trading liquidity under the brokerage model can be enhanced through the development and coordination of hub services once the hub is established.

### The brokerage model and STTM model

The proposed brokerage hub differs from the STTM model in a number of ways. Unlike the brokerage model, STTM hubs have been established at demand centres. Participation in a STTM hub is mandatory, while participation in the gas supply hub would be voluntary. Participants that already receipt or deliver gas at Wallumbilla need not participate in the supply hub. Third party data suppliers would also not be involved in the direct operation of the supply hub. In comparison, pipeline and network operators have a regulatory obligation to supply information to the STTM for input into the scheduling and settlement of the market.

The market price and quantity schedules at an STTM hub are cleared once a day. While the gas supply hub will trade continuously, allowing potential buyers and sellers to be matched throughout the trading day. The STTM also schedules gas based on bids and offers and a set of rules that optimises the volume of trade for gas on a particular day. At the supply hub, the reported prices at
which transactions are executed are simply the price that buy and sell orders are individually matched by the exchange.

There is scope for interaction between these two markets. Participants in the STTM could purchase gas through the supply hub for sale and delivery to an STTM hub. Efficiency of trading between markets will depend on the spare capacity participants maintain within their portfolio and the spare capacity other participants make available for trading. While a user could purchase additional gas through the STTM, the gas supply hub gives an STTM user the opportunity to secure those supplies and fix a price for those supplies in advance of the gas day.

**Benefits of the brokerage model**

There are a number of benefits associated with this model, including simplicity, transparency of prices, collateralisation, standardisation of trading contracts and ease of implementation, as follows:

- **Trading hub**

  The three hub nodes draw in a number of participants who currently have capacity to flow gas to and from each node. Participants currently able to trade at least one node include end users, generators, producers, traders and retailers, while several participants are able to trade at multiple nodes and flow gas between the nodes. The concentration of participants and the ease of transactions encourages the development of trading liquidity and price discovery.

  A brokerage hub does not require services to develop or a hub manager to coordinate operations at the hub, nor does it necessitate new investment or change existing operations between facility operators and their shippers.

  The listing of available capacity and facilitating the development of forward products, such as futures can readily support the hub as currently structured. The capacity to evolve and ease of development makes the hub a sustainable long-term trading proposition, able to adapt to industry needs.

- **Low cost**

  The implementation of the brokerage model would enable participants to secure short-term commodity while incurring low transaction costs. This removes a barrier to entry for smaller participants and reduces their cost of doing business. This will improve market entry and participation, increasing liquidity and efficiency improvements, while potentially lowering costs to consumers.

  The additional transparency of price and market information that the exchange will provide should better enable parties to compete on a level playing field, minimising risk to market participants (particularly smaller players and intending trading participants) both in terms of decision-making around timing of market entry and cost of making commercial decisions with relevant information to hand.

  A low-cost model and improved transparency should encourage better decision-making—particularly around allocation of resources where market signals show it is more valued, ensuring that price signals are not dampened by lack of access and information.

- **Collateralisation**

  The hub will be supported by a credit and risk management approach that will secure outstanding credit with collateral, providing participants with access to a greater number of trading partners than through bi-lateral arrangements. The collection of collateral from all trading participants and its monitoring against trading positions ensures that participants who may not normally trade with one another would be able to execute a trade with the knowledge that the market holds a level of collateral to safeguard positions in the case of default. This approach enables the market to facilitate liquidity by allowing more potential transactions to be completed than might otherwise be the case.
While collateralisation would protect the market from default risk, the collateral provided by a trading participant under this approach must meet its potential liability at any time. For the day-ahead product the credit support requirements will be assessed for buyers based on the full value of the transaction. The same approach would be extended for the trading of forward-dated products. While not expected to be a problem in the cash market, collateral requirements would be substantial where a trading participant has forward trades stretching a significant time span into the future. This would require the participant to post collateral equal to full contract value for each transaction, acting as a potential barrier to product development or trade at the exchange. AEMO is exploring potential options, including the services of a clearing house, for a more efficient use of collateral requirements.

- **Standardisation of contracts**

  The detailed design supports the ongoing development of standardised contracts through a variety of products, through which the market is able to develop a consistent understanding of market risk and prices for each product. The associated certainty supports liquidity in trading markets. When standardised commodity contracts are available to multiple participants through an organised market the benefits are increased and captured across all participants rather than on a bi-lateral basis, in turn reducing transaction costs and supporting increased competition amongst participants seeking to buy or sell the same product.

- **Portfolio optimisation**

  Portfolio optimisation is unique to each participant. A voluntary trading market enables participants to enter the market when there is a commercial need and if a commercial opportunity arises. An end-user may have to conduct unplanned maintenance in the week ahead and have to choose between banking the gas, breaching take-or-pay obligations, or selling the gas to the market. The user will choose the option that maximises its outcome. Similarly a generator may want to purchase additional gas to capture additional revenue through the electricity market that it may not have been able to under an existing gas supply arrangement.

- **Price transparency**

  The exchange will match participants on price to execute a trade through a continuous automated trading process. At the end of each trading day an average daily price will be published. Over time the daily price may become a reference price to support innovation in off-market contracts. A daily price indicator could also be useful for buyers and sellers across all inter-connected gas markets.

  To date, the gas industry has not been successful in creating a transparent forward curve. The advent of monthly and quarterly standardised products on the exchange will allow the development of a forward curve for gas. The forward price of gas will directly reflect near-term supply and demand dynamics. If a shortage of supply is possible in two months, the month ahead and quarterly products will factor in the available information and the forward price may rise. A participant can use this information to make its commercial decisions about its own contractual position.

- **Forward products**

  The development of a liquid forward trading market would allow buyers and sellers to replace a component of their long-term gas requirements with forward-dated products that are transacted on a short to medium-term basis. For energy retailers, forward-dated products could be used to build up their supply portfolio to match seasonal variations in demand and would also provide the flexibility to adjust their supply portfolio in response to retail customer churn.
Liquid markets for forward-dated products would provide the industry with a transparent forward curve. A transparent forward curve could be used by industry as an input into trading, risk management and business development decision-making.

**Limitations of the brokerage model**

- **Availability of capacity**

  GSHRG members indicated concerns relating to the availability of both transmission pipeline capacity and hub capacity. While long-term contracts have proved successful in delivering infrastructure investment in Australia and most other global markets, new participants (like retailers, generators or large users) face the challenge of augmenting infrastructure or negotiating access with existing capacity owners to enter the market. For Wallumbilla in particular, obtaining capacity can require investment or negotiation with multiple existing capacity owners and holders.

  In Australia, capacity owners can sell their capacity to other participants but the transparency of capacity availability can be problematic for participants when faced with short-term needs. Without access to capacity the potential purchasers of gas at the supply hub could be limited, reducing liquidity at the exchange.

  AEMO is looking to leverage off the establishment of the exchange framework and systems to support voluntary secondary trading of transportation capacity. Once established, the trading facilities could also enable participants to list spare capacity in other hub services including storage, compression and other hub services.

- **Delivery of hub transactions**

  As is the case with existing bilateral trades, the actual quantity of gas delivered at Wallumbilla can vary from the quantity of gas transacted on the exchange for a number of physical and contractual reasons. The actual quantity of gas receipted into the pipeline is allocated amongst participants in accordance with the underlying allocation agreement for the relevant receipt point. The implementation of balancing services would help reduce any quantity variance and enhance the delivery of exchange-scheduled quantities. This would provide an additional layer of certainty to the product making them more valuable to participants for the management of their portfolio requirements. If actual flows in or out of the trading location were not able to match the nominated quantities, the service provider would source (or store) the difference.

- **Availability of hub services**

  While existing infrastructure at Wallumbilla has developed through long-term arrangements, access to capacity and services at the hub requires investment or access by negotiation with multiple existing capacity holders.

  Participants who currently cannot transit between the hub (or may not need to) will be restricted to participate in trading at existing points of access until services are developed that enable transit across the hub. A mismatch between buying and selling interest at the different trading locations can only be alleviated by traders with the ability to transfer gas across the hub.

  Key initial services are:

  - redirection services - a re-direction service would allow a shipper to sell their excess gas at the RBP and for that gas to be notionally purchased at the SWQP hub exit location; and
  - compression services - these services may need to be used to re-direct the gas to the alternate delivery location.

  Not all trades across the hub require physical gas to be transferred across the hub. Without the coordination of these services the market misses out on the opportunity to net the delivery positions across the trading location, reducing the quantity of physical gas that must be transferred across the hub.
Storage services could help with day-to-day balancing requirements aiding the reliable and secure trading of gas. Storage services could also help shippers manage their exposure to high gas prices and optimise their gas portfolio. Parties could buy gas and inject it into storage when prices are low and retrieve the same gas from storage when prices are high. The trading opportunities that the storage services create could also attract additional trading parties to the hub, enhancing liquidity. For investors in storage capacity, the gas supply hub could provide an opportunity to receive a commercial return through the trading of their services.

- **Multiple trading locations**

  Multiple trading locations (products) for essentially the same commodity traded within a small geographical area will split potential buyers and sellers of gas making it more difficult to match buyers and sellers, limiting the trading liquidity. The establishment of a single trading zone at Wallumbilla would pool all potential buyers and sellers around a single product making it more likely for trading liquidity to gain the momentum required to realise the full benefits of the gas supply hub.

- **Delivery**

  While traders may physically net out positions prior to delivery they will still be responsible for delivery and settlement obligations for each individual transaction. This process, while straightforward, increases the administrative burden on participants when positions are on-sold through the exchange.

  For example, A buys 10 TJ from B and sells 10 TJ to C, both of these transactions would remain on foot, and A would remain contractually tied with its counterparts, to both make and take delivery.

  An alternative to the proposed delivery model would be to allow participants to deliver the net position across all transactions for a particular product, where the delivery obligations are the same for all product types the netting of delivery positions could be across all transactions for the same delivery period.

  Under this alternative model, only net positions at a given location are scheduled for delivery. In the example above, B may be paired with C, while A no longer have any physical obligations for the above transactions. This would further support anonymous trading as neither B nor C would be aware that A was counterparty to their transactions. The only counterparty a trading participant would need to know is the party it is matched with for delivery.

  The delivery of net positions would provide administrative value to trading participants and would help to alleviate the concerns raised by the GSHRG for the support of trading products on the RBP. AEMO is currently considering the legal and regulatory implications of offering this service to the market.

### 3.2 Trading at the gas supply hub

The establishment of the gas supply hub will facilitate the wholesale trading of natural gas between participants at the Wallumbilla hub. As part of the detailed design, AEMO has considered the standard trading and contracting arrangements required to support the establishment of the brokerage hub. These arrangements are specified within the products to be traded.

Trade at the hub will be voluntary and exchange-based, with buyers and sellers able to anonymously place orders – either bids (to buy) or offers (to sell) - via the trading interface. The trading system then matches bids and offers on price to execute a trade.

**Participant registration**

As a voluntary market, Part 15A of the National Gas Rules will not apply to hub trading. However, the registration processes for the gas supply hub will leverage arrangements for existing electricity
and gas markets operated by AEMO. To participate in the gas supply hub, each organisation must agree to be bound by the Exchange Rules by executing a membership agreement with AEMO.

AEMO proposes two classes of participants at the gas supply hub:

- **Viewing Participant**: Non-trading Participants will be able to access market information directly from the Trading System, but orders and transactions will be anonymous.
- **Trading Participant**: Only Trading Participants will be able to submit orders for the purchase or sale of gas through the trading platform.

A prospective Trading Participant will need to provide AEMO with organisational and financial information, pay the fixed annual participation fee and post collateral with AEMO to be granted a financial trading limit on the exchange. Non-trading organisations will also be required to register, execute the membership agreement and pay the fixed fee.

The exchange platform will be web-based and may be accessed by registered participants via a secure connection and user account, as for AEMO’s existing gas and electricity markets.

The gas supply hub will overlay the existing contractual supply and transportation agreements and as such participants must warrant they have the necessary contractual access to a trading location when trading through the gas supply hub.

**Trading products**

AEMO aims to offer the market a small suite of well-defined and -structured products that can form the basis for on-going product development at the gas hub. Each product listed on the exchange will have a specific term and will relate to the delivery of gas to a specific location. Parties to a transaction will be required to deliver and take receipt of gas uniformly across the gas day. The core products to be listed are the ‘day-ahead’, ‘balance-of-day’ and forward products:

- **Day-ahead Product**
  The standard delivery period (term) for the day-ahead product is a single gas day. The trading window for the day-ahead product will open four calendar days prior to the gas day and will close at the end of the trading day preceding the delivery day.

- **Balance-of-day Product**
  The trading window for a gas day will be extended into the gas day through the establishment of a separate ‘balance-of-day’ trading product. Delivery of gas will occur from the hour after the time of the transaction through to the end of the gas day. This product will enable parties to manage imbalances within the gas day.

- **Forward-dated Product**
  ‘Forward-dated’ products include products scheduled to commence delivery more than seven calendar days from the date of trade execution. The trading, delivery and settlement framework established for spot transactions as set out in this report can be leveraged to support the development of forward-dated products. Appendix 2 provides further details on the benefits of forward trading products, as expressed by the GSHRG.

**Trading location**

The delivery location specified in the trading product is the physical point or points at which gas is delivered to and the point at which title transfers from a seller to a buyer. A trading location has been defined for each of the main pipelines connecting to the Wallumbilla hub (see Figure 1). Trading products will link the delivery of gas to one of these standard trading locations. To trade a particular product a participant must have the contractual right to deliver or receipt gas at the specific trading location.
Trading locations may be established as either a single delivery point representing one run into which sellers deliver to, and buyers can take gas away from or multiple delivery points that can be combined to represent one point.

The benefit of multiple delivery points for a single product is that the more physical points referenced by a product, the greater the number of potential buyers and sellers able to trade that product. Over time this should encourage greater investment and augmentation at certain trading locations.

AEMO proposes to define each Trading Location as a collection of delivery points as set out in Table 1.

**Table 1: Trading locations and delivery points**

<table>
<thead>
<tr>
<th>Trading Location</th>
<th>Facility Operator</th>
<th>Delivery Point</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RBP</td>
<td>APA Group</td>
<td>Run 3</td>
<td>Delivery point - the interconnection of the SWQP and RBP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Run 4</td>
<td>Delivery point - the interconnection of the QGP and RBP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Run 7</td>
<td>Delivery point - the interconnection of the RBP and Spring Gully pipeline.</td>
</tr>
<tr>
<td>QGP</td>
<td>Jemena</td>
<td>Run 3</td>
<td>Receipt or delivery point - interconnection of the SWQP and QGP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Run 10</td>
<td>Receipt or delivery point - interconnection of the SWQP and QGP.</td>
</tr>
<tr>
<td>SWQP</td>
<td>EPIC Energy</td>
<td>Run 6</td>
<td>Spring Gully receipt point - the interconnection of the SWQP and Spring Gully pipeline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Run 9</td>
<td>Darling Downs receipt point - the interconnection of the SWQP and Darling Downs west pipeline.</td>
</tr>
</tbody>
</table>

The legal framework for the exchange will be structured to facilitate the addition of further delivery points, groups of delivery points, or to add new trading products depending on participant requirements. Where a new transmission pipeline connection occurs, a new product that specifies the relevant location can be readily added to the suite of products traded on the exchange if deemed by the market to be an efficient point of trade.

**Trading Platform**

To implement the gas supply hub, AEMO will develop an exchange to facilitate continuous automated matching of buyers and sellers of gas in the form of a trading platform, including the following:
- a web-based platform through which trading participants can access the exchange;
- functionality to list multiple trading products, representing different trading locations and contracting periods;
- ability for trading participants to post bids or offers for products, have those orders matched and provide confirmation of transactions to trading participants; and
- a display of active orders and prices along with all recent trading history.

Figure 2 provides a screenshot of the proposed trading platform.

Figure 2: Proposed trading screen

Participants will be able to submit buy and sell orders directly to the trading platform for each trading product (relating to the physical delivery of a quantity of gas at any trading location). A sell order (offers) means that a participant is prepared to sell the offer quantity of gas for delivery at the trading location at a price equal to or greater than the offer price. A buy order (bids) means that a buyer is prepared to buy the bid quantity of gas for receipt at the trading location at a price equal to or less the bid price.

All orders can only be submitted by the approved systems of the market operator. Trading systems will include automated validation to allow participants to verify they have submitted a currently valid bid or offer successfully within the trading systems.

### 3.3 Delivery

#### Delivery Framework

By entering into a transaction on the exchange the seller commits to supply gas at the trading location and the buyer agrees to take receipt of that gas at the trading location.

Buy and sell orders matched on the exchange (as per trading platform outlined in section 2.1) will be communicated to the buyer and seller at the time of the transaction. Participants will then be responsible for arranging the delivery of gas at the hub using existing contractual supply and
transportation agreements. The pipeline operator will schedule the delivery of gas at the trading location based on nominations submitted by participants.

Participants will determine the delivered quantity for each hub transaction based on the allocation information for the trading location. Participants can elect to settle a variance between the delivered quantity of physical gas and the transaction quantity (delivery variance) through the hub trading and settlement system.

**Existing delivery arrangements**

Gas suppliers, energy retailers and large energy users maintain a portfolio of long term Gas Sale Agreements (GSAs) and GTAs to meet the gas needs of industry across Eastern Australia. Wallumbilla is a major supply point for gas markets across Eastern Australia. Many producers, energy retailers and large energy users have existing GSAs for the delivery of gas at Wallumbilla and GTAs for the receipt of that gas and transportation away from the hub on the RBP, QGP and the SWQP. Figure 3 presents existing delivery arrangements and proposed arrangements under the gas supply hub.

*Figure 3: Existing delivery arrangements*

**Delivery of hub transactions**

Buyers and sellers will warrant that they have a contractual right to deliver or receipt gas at the trading location.

When buy and sell orders are matched by the exchange the buyer and seller receive a Trading Notification, based on which the buyer and seller make nominations under their existing supply and transport agreements to facilitate the delivery of gas at Wallumbilla.
The pipeline operator will schedule gas based on the nominations it receives from shippers and in accordance with contractual rights and priorities. The pipeline operator transports gas on the day to meet the pipeline schedule.

Pipeline metering and allocation data is the primary input for the billing of natural gas and transportation services and will be used by participants to determine the quantity of gas delivered to the hub.

**Delivery variance**

The actual volume of gas physically delivered at a trading location can vary from a participant’s nomination (transaction volume). The actual quantities receipted into the pipeline are allocated between the shippers under an allocation agreement for that receipt point. If a trader does not supply or take receipt of the quantity of gas it has transacted for a gas day then it has breached its delivery obligations under the Exchange Rules.

**Settlement of delivery variance**

AEMO’s delivery model provides a mechanism to facilitate payment between the trading parties to compensate for a variance between the delivered quantity and the transaction quantity. The model provides flexibility for participants to choose between settling the delivery variance bilaterally with their counterpart or to bring the variance to the market where it will be conveniently settled as part of the regular billing process for the gas supply hub transactions. A participant may elect to settle a delivery variance bilaterally if they have existing supply arrangements with their counterpart where the gas can be physically paid-back on another gas day.

Regular settlement of the market will be unaltered, with exchange transactions settled based on transacted quantity. If AEMO is notified by the trading parties that the delivered quantity is not equal to the transaction quantity then AEMO will adjust the settlement of each of the parties through separate delivery variance charges and payments.

As shown in Figure 4, the calculation of the delivery variance charges and payments will depend on the amount by which the delivered quantity varies from the transaction quantity.

1. **Delivered quantity within tolerance**: Delivery variance quantity is settled at the transaction price.

2. **Delivered quantity outside of tolerance**: Delivery variance quantity is settled at the transaction price plus an amount to compensate for the delivery failure.
AEMO proposes that an additional 25% of the transaction price is paid by the defaulting party when the delivery variance is greater than 5% of the transaction quantity (tolerance). The delivery payment and charge settlement mechanism within the Exchange Rules will be the only remedy available for a breach of a participant’s delivery obligations.

**Determinant of delivered quantity**

Under the brokerage hub model the pipeline operators do not provide allocations to the market operator. The allocation information provided to shippers by the pipeline operator, and any subsequent sub-allocations, will be the basis for determining the delivered quantities for transactions executed on the exchange.

**Communication of delivered quantity information**

AEMO will develop a web-based interface (as detailed in Appendix 3) to the market systems that will allow participants to communicate the delivered quantity against hub transactions so that compensation for a breach of delivery obligations can be settled via the hub trading and settlement system.

Buyers and sellers will maintain a record of allocated quantities from the pipeline operator so that the delivered quantities notified to the market can be verified in the event of a disagreement on the delivered quantities by the trade counterparties.

**Potential allocation issue at RBP trading node**

APA Group has informed AEMO that the current allocation agreements and associated processes and systems for setting up bilateral trades between shippers could complicate the implementation of hub trading on the RBP.

Allocation agreements on the RBP link a producer or a shipper on an interconnecting pipeline or facility to shippers on the RBP that have contracted for the purchase of gas. The configuration of trades in the allocation agreement must be set up before entering a trade so that nominations and allocations can be made against the correct parties. APA advises that currently it can take up to 4 weeks to complete the configuration of new interconnect/shipper pairings for bilateral trades.
Description of current process

As shown below in figure 5, new bilateral trades are set up in the receipt point allocation agreement and systems prior to the commencement of contracted deliveries. Contracting parties must make a written request for the trade to be reflected in the allocation agreement. APA then implements the change to the allocation agreement and tests that change in its systems.

**Figure 5: RBP receipt point allocation agreement**

Sellers and Shippers provide nominations to APA that reference the relevant contracts (nomination points) under the allocation agreement. This allows APA to trace the delivery of gas into the pipeline to the shipper that ultimately receipts that gas for transportation on the pipeline.

**Hub transactions on the RBP**

Under the proposed trading arrangements for the gas supply hub, the buyer will not be known to the seller until their orders are matched and a transaction is completed. To facilitate hub transactions within the current allocation agreements, each seller would need to be linked to all of the potential buyers (registered trading participants). AEMO understands that this would require a substantial increase in configuration work for APA and its shippers.

Hub transactions on the RBP will not be feasible under the current set-up process. It will therefore be necessary to implement one or more of the following options: simplify the set-up process within the APA systems; allow the delivery of net trading positions under the Exchange Rules; or limit the on-selling of hub transactions.

**Options to assist set up of gas supply hub transactions**

APA and AEMO are of the view that a combination of the options below will simplify trading for participants and are committed to working towards a positive outcome by market start in 2014.

1. Simplify APA’s set up process

APA amends its process and systems to simplify the configuration of trades in the allocation agreement as the current methodology will become unworkable once gas is traded multiple times between shippers. This will require a change in allocation philosophy from currently tracking every transaction from buyer to shipper and then from shipper to shipper.

APA is investigating alternatives to the current allocation process and will discuss these with its shippers in due course.

2. Develop delivery netting for hub transactions

Delivery netting involves AEMO determining the net delivery position for each participant at the end of trading for a day-ahead product. AEMO would then match participants with offsetting delivery positions based on an algorithm that minimises the number of transactions that need to be delivered. Netting delivery positions avoids the need to maintain a chain of transactions that would be associated with on selling of the same parcel of gas. As such, there would only need to be one
layer of potential hub transactions configured in the allocation agreement for suppliers and shippers.

This will only solve part of the problem for shippers in that net trading positions will still need to be configured within the existing allocation tree. Any new trading partners would still take time to configure and would not be able to be netted against hub transactions in the nomination and allocation process. AEMO also notes that the legal and regulatory implications of delivery netting require further investigation.

### 3.4 Settlement and credit risk management

AEMO proposes a centralised settlement model, based on physical gas transactions (price and quantity at which physical gas products are transacted) and the quantity of gas delivered to the hub. The settlement model is aimed at:

- minimising the credit risk to participants resulting from a payment default;
- minimising transaction costs;
- efficiently using collateral provided by participants;
- minimising barriers to entry for new participants;
- leveraging the existing markets operated by AEMO, to reduce costs to AEMO and participants.

The centralised settlement model will involve the collation of transactional information from the trading system and delivery information from participants, the calculation of settlement amounts, and the issue of statements to participants. The settlement process for the supply hub is consistent with AEMO’s existing settlement processes in other markets (the steps involved, and other relevant detail, are included at Appendix 2).

#### Credit risk management

Consistent with the centralised settlement model, AEMO proposes that credit risk be managed centrally as a service provided by the market operator. Under a centralised model the risk of a payment default is borne by all traders that are owed money by the market. Credit risk associated with the gas supply hub will be managed separately from other markets operated by AEMO – this means that collateral posted by a participant for other market operated by AEMO cannot be applied to the gas supply hub.

The market operator will require participants to post collateral to cover the potential settlement exposure associated with their hub transactions to minimise the risk of payment default impacting on the payment of participants by the market.

In the event of a payment default AEMO would make a call on that participant’s collateral so that it can meet the payments to traders that are owed money from the market. Any residual shortfall would reduce the payments to traders on a pro rata basis, as in the STTM and the DWGM.

### 3.5 Market conduct

The Exchange Rules will require participants to comply with market conduct requirements, which seek to protect the integrity of the market. The Rules will include a general obligation on participants to observe high standards of market conduct and to act with due skill, care and diligence in using the trading system and performing transactions. There will be specific conduct obligations in relation to submitting orders, exchange of information, compliance, performance of contracts and market manipulation.
If AEMO has reasonable grounds to believe a trading participant has breached the market conduct rules and the breach is sufficiently serious to warrant action being taken, the Operator may impose specified sanctions and/or refer the conduct to the AER if AEMO still has concerns after investigating the issue with the participant. AEMO’s process for managing market conduct will be independent to the AER’s market monitoring process as the potential outcomes for the trading participant will be quite different. The following interaction between the two processes though will occur:

1. AEMO identifies a potential issue with a participant’s conduct;
2. AEMO discusses conduct with the trading participant and investigates. If AEMO is satisfied that no misconduct has occurred then AEMO pursues the issue no further. AEMO will not notify the AER;
3. If still concerned, AEMO will issue formal notice to the participant as per the step 1 on page 54 (of this report). AEMO will concurrently advise the AER of its preliminary inquiries into the participants’ specific conduct.

For these purposes, AEMO proposes that the NGR will require gas supply hub participants to comply with the market conduct rules, so that a breach of those Rules would be a breach of the NGR for which the AER could take action under the NGL. It is envisaged that this will be both a civil penalty and a conduct provision.

### 3.6 Market information

The gas supply hub would generate information that improves transparency of trading activity within the Queensland region, available to both participants and non-participants. Information provided to participants from the exchange will help support the market’s efficient and effective operation.

The distribution of market information has been grouped into three categories:

- public information – data available to all parties, including the public;
- participant information – data available to participants and non-trading participants; and
- private information.

AEMO proposes to make this information available at set times through the trading system, depending on the requirements of participants and non-participants. These set times could be real-time, at the end of the trading day and at the end of the billing period (for settlement information).

Appendix 2 provides further detail about the form in which the information will be published, as well as information about the timing and method of publication of the market information.

### 3.7 Dispute resolution

The Exchange Rules will contain an informal process for the resolution of disputes about the application or operation of the rules or performance of a hub transaction. The parties to the dispute will be required to nominate an executive who will participate in dispute resolution negotiations.

The buyer and seller are responsible for reaching a resolution for disputes about delivered quantities, the mechanism for which may be governed by the rules of the underlying allocation arrangement. The buyer and seller must pay the costs incurred by the market operator, if any, in connection with the resolution of the dispute.

If informal dispute resolution does not resolve the dispute within the time specified in the Rules then any party to the dispute may take the matter to the courts for resolution.
4 Capacity trading

AEMO proposes to make it easier for participants to trade capacity within the existing regulatory and contractual frameworks. A more efficient and timely mechanism for the bare transfer of capacity would complement the development of the gas supply hub, while facilitating gas trade at the hub and between regions.

AEMO proposes to work with the GSHRG over the next 12 months to develop a framework that supports the voluntary secondary trading of capacity by leveraging the proposed trading arrangements and the standardisation of terms. It is proposed that the trading of capacity be facilitated through a bulletin board approach, enabling participants to advertise a willingness to trade a specific transportation service. Traders could identify potential counterparties, before commencing bilateral negotiation of quantity, price and terms of a capacity trade. The execution of trade, settlement and credit risk management arrangements would be managed by participants outside the market.

The development of standards for the secondary trading of capacity by industry could, in the future, allow transportation and hub services to be listed as trading products on the exchange. The development of exchange traded capacity products would simplify the trading process for participants as potential buyers and sellers need only agree to the price and quantity of a product to complete a transaction. There are however a number of challenges to the standardisation of terms for capacity trading products and to develop the necessary trading liquidity it will be important to select a set of receipt and delivery points that can be accessed by many potential buyers and sellers.

Appendix 4 provides further detail about capacity trading.
5 Legal and regulatory framework

Implementation of the supply hub would require amendments to the National Gas Law (NGL), National Gas Rules (NGR) and National Gas Regulations (Regulations). In AEMO’s view, the legislative instruments should provide a framework that is broad enough to accommodate the market scope set out in this report as well as the prospective development of the exchange to accommodate industry demand for additional products, additional locations and services.

As a voluntary market intended to promote liquidity in the wholesale market for gas, AEMO considers that legislative restrictions on the future expansion of the exchange should be minimal, subject to the overarching national gas objective. Ideally, subsequent development should be led by participants’ requirements through the rules of the exchange itself, and only constrained by technical and commercial feasibility and by the laws applicable to markets and trading of relevant products.

The NGL would need to be amended to include supply hub operation as one of AEMO’s statutory functions. Amendments to the NGR are likely to be limited to the definition around conduct and provision for the Exchange Rules (at Appendix 5). The Exchange Rules would contain the majority of obligations (to support flexibility and continued evolution of product design). They would include the terms of transactions in tradable products for physical delivery of gas at the supply hub delivery points.

Exchange Rules and transactions

As noted in the section on participant registration, the right to participate in the exchange will be established through a membership agreement, which would take effect as a multilateral agreement between AEMO and all participants. Each new participant would accede to the membership agreement, under which it agrees to be bound by the rules and associated terms and conditions. The rules will cover the matters discussed in section 3 of this report.

The matching of orders for a product will result in a ‘transaction’ (or contract) for delivery and acceptance of that product between the counterparties, but payment obligations in relation to that transaction are owed by or to AEMO (subject to the rules applicable to that product). The product terms in the exchange rules will reflect the arrangements for trade execution and delivery of physical gas.

Change process for the Exchange Rules

All exchange members can raise proposals to modify either the Exchange Rules or product specifications. As market operator, AEMO will manage the process for consulting on and considering amendment proposals with change processes similar to the existing gas market procedures made under the NGR. Change proposals (raised by AEMO or exchange members) will be subject to consultation through a members’ forum. AEMO will consider views raised and publish draft and final decisions taking into account feedback received. Where amendments require systems changes, efforts will be made to keep these within existing systems release processes to reduce costs as far as practicable.
6 Cost-benefit assessment

AEMO has conducted a relatively straightforward cost-benefit assessment for the implementation of the supply hub at Wallumbilla. Three key elements form the basis of the assessment:

- AEMO implementation and ongoing operational costs;
- industry costs; and
- qualitative benefits of market implementation.

In addition to these elements AEMO has sought examples from industry indicating where trading participants would see value in developing a gas supply hub.

**AEMO costs**

The detailed design and initial implementation plan have been influenced by stakeholder feedback in relation to the importance of the simplicity and cost effectiveness of the model.

AEMO has evaluated the implementation and ongoing costs of the supply hub based on the detailed design described in this report, with a view to market commencement in March 2014. As much as possible the market systems and processes will leverage arrangements for existing gas and electricity markets. The cost estimates are based on the requirements for the implementation of the core trading products proposed for market start. Enhancements to the model, for example the development of netting of delivery positions, are likely to require additional IT development work.

Costs have been broadly categorised into two components, to distinguish the costs associated with third party software licensing. This has been done to assist AEMO and the industry to establish an appropriate fee structure for products and services during the implementation phase.

- Implementation costs for AEMO include costs associated with the implementation of the exchange platform and system integration and operations, and have been estimated at between $1.4 million and $1.7 million:
  - Exchange platform - the exchange platform is likely to be provided by a third party and will have both annual licensing and an initial configuration cost. Only the configuration cost will be included in the implementation cost, while the annual license fee will form part of the operational costs.
  - System integration and operations: these costs represent the integration of the exchange platform to existing AEMO settlements and registration systems, as well as the development of the business processes to support the activities of the market.
- Annual operational costs have been estimated at $570 thousand, comprising:
  - exchange platform licence fees; and
  - business services (prudential monitoring, IT support, product development).

<table>
<thead>
<tr>
<th></th>
<th>Low $000's</th>
<th>High $000's</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>System integration</td>
<td>560</td>
<td>745</td>
</tr>
<tr>
<td>Operations</td>
<td>655</td>
<td>735</td>
</tr>
<tr>
<td>Exchange platform</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>$1,305</td>
<td>$1,570</td>
</tr>
<tr>
<td>Total including contingency</td>
<td>$1,400</td>
<td>$1,700</td>
</tr>
</tbody>
</table>

Table 2: Implementation and operational costs
### Operational costs

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Business support</td>
<td>370</td>
<td>370</td>
</tr>
<tr>
<td>Exchange platform</td>
<td>200</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>570</strong></td>
<td><strong>570</strong></td>
</tr>
</tbody>
</table>

### Industry costs

At the time of writing, AEMO had not received a significant number of responses from trading participants outlining costs for this market. Some participants have indicated that they do not intend to submit any costs for the gas supply hub as it is seen as an incremental cost to existing processes and arrangements for other energy markets. Some participants have also noted that, as the market is voluntary, they will participate if and when they see a commercial benefit and therefore do not expect to submit any direct costs for this assessment as their participation would acknowledge they see a benefit in participation.

Given the diverse range of participants in the proposed gas supply hub it is difficult to ascertain a standard set of costs given that each will interact with the market differently and with differing levels of throughput.

AEMO has received some cost estimates from participants covering two categories:

- **Implementation costs**: Five participants have indicated that costs for the implementation of the brokerage model would be in the region of $100 thousand. Other participants have suggested that they may be able to leverage existing systems to minimise establishment costs and therefore the costs are not material in this case. One participant has indicated that costs for more frequent and high volume trading may require a more integrated internal system at a cost of up to $1.5 million.

- **Prudential costs**: Trading participants estimate that collateral requirements may be in the region of $0.5 million for an individual participant. However the bank fees that are payable on this face value of collateral will vary between participants as will the actual quantum as it will be a function of their estimated trading activity.

- AEMO also recognises the time and effort that industry participants have contributed to the development of the detailed design and this report through industry meetings and liaison with AEMO.

### Benefits

The broader benefits of the market have been discussed throughout this report. AEMO has asked participants to outline some specific examples of how value can be derived from the implementation of a gas supply hub. Trading participants have provided examples outlined below.

Large gas users may have limited flexibility within their long term GSAs to turn-down or ramp-up supply to meet their changing gas needs. In the example of a GPG, in the absence of a liquid trading market and without the flexibility to turn down their supply then the trader will have no choice but to treat their gas purchases as a sunk cost and to try to extract as much value as possible from that gas by generating electricity. During periods of low electricity prices, as observed during the past financial year, the GPG may only be able to recover a portion of the gas cost from electricity market revenues. A liquid trading hub could provide such users with the opportunity to sell excess gas at a higher effective price than that which can be realised from the electricity market and to avoid variable operating and maintenance costs. These types of trading opportunities would result in superior financial outcomes for the gas user and would result in more economically efficient use of gas across industry. An example assists to illustrate the potential benefit (table 3).
A gas powered generator has a take-or-pay obligation on a long term gas supply contract. Under a scenario of low electricity prices the only way the generator can ensure that take-or-pay obligations are met is to burn the gas at sub-optimal electricity prices. Once adjusted for the cost of carbon a generator will be able to calculate the value of gas at prevailing electricity price. The difference between this price and the contract price represents the avoided loss by generating electricity. In turn it also represents the benefit of being able to sell gas to a market at the prevailing market price when it is uneconomic to generate electricity.

In the example below if a participant was able to optimise between the gas and electricity markets on an assumed volume of 10PJ per annum, then, the potential benefit of trade would be $10 million.

Similar opportunities would be present for any party needing to manage changing operational requirements. Benefits to the seller include reducing take or pay risk whilst the buyer mitigates exposure to potential gas shortfalls.

Table 3: Trading example

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas contract price</td>
<td>$4.00 /GJ</td>
</tr>
<tr>
<td>ToP risk mitigation sales to hub</td>
<td>10,000 TJ</td>
</tr>
<tr>
<td>Electricity price</td>
<td>$55.00 /MWh</td>
</tr>
<tr>
<td>Less carbon cost (intensity factor x carbon price)</td>
<td>0.5 25 $12.50 /MWh</td>
</tr>
<tr>
<td>Less variable operation maintenance costs</td>
<td>$10.20 /MWh</td>
</tr>
<tr>
<td>Adjusted electricity price</td>
<td>$32.30 /MWh</td>
</tr>
<tr>
<td>Equivalent gas price (adj electricity price/heat rate)</td>
<td>12 32.3 $2.69 /GJ</td>
</tr>
<tr>
<td>Avoided loss (contract price - equivalent gas price)</td>
<td>$1.31 /GJ</td>
</tr>
<tr>
<td>Total benefit / avoided loss on 10,000TJ</td>
<td>$13,083,333</td>
</tr>
</tbody>
</table>

7 Proposed fee structure

AEMO proposes to recover the costs of establishing the gas supply hub from participants over a five-year period. Section 5 outlines the capital and operational expenditure to be recovered over this period. As a voluntary market, it is expected that liquidity and participation will grow over time. AEMO may under-recover fees in the first one or two years before potentially over-recovering in later years as volumes and liquidity grow. Appropriate adjustments would be made to ensure cost-reflective recovery over time.

AEMO will engage with participants during the implementation phase to set the initial fees. The initial fee would be targeted to facilitate maximum participation at the hub, attracting small participants who would transact only small volumes, whilst also attracting large players who would benefit from lower transaction costs.

The hub fee structure would include both fixed and variable components. The fixed fee component will be recovered from both Viewing and Trading Participants and would be designed to recover the cost of licensing and support associated with the exchange platform and settlement systems.

The fixed fee component will be payable upfront on registration and annually in advance. AEMO currently envisages it would be within the following range:

- Viewing Participants: $3,000 - $6,000 per annum
- Trading Participants: $7,000 - $14,000 per annum
AEMO proposes that the variable component of the supply hub fees would be charged based on energy transacted (buys and sells) through the exchange on a $/GJ rate and payed through the monthly settlement process.

Variable fees for Trading Participants are expected to be within the range of $0.03/GJ - $0.06/GJ.

8 Recommendations

To implement the brokerage model as outlined in this detailed design report, AEMO seeks SCER’s approval of the following recommendations. AEMO recommends that the SCER:

- Task AEMO to implement the proposed detailed design for a brokerage hub at Wallumbilla;
- Require AEMO to further develop a voluntary shipper-to-shipper capacity trading mechanism to complement SCER’s current review of capacity trading and design a forward product to list on the exchange; and
- Require these recommendations to be delivered by March 2014.
9 Appendices

Appendix 1: GSHRG membership

Appendix 2: Detailed design
- Trading at the hub
- Delivery
- Settlement and credit risk management
- Market information
- Market operation
- Market conduct
- Participant registration and suspension

Appendix 3: End-to-end example

Appendix 4: Capacity trading

Appendix 5: Market systems overview

Appendix 6: Legal and regulatory framework

Appendix 7: Exchange Rules
Appendix 1: GSHRG membership

AGL Energy
Alinta Energy
APA Group
Arrow Energy
BHP Billiton
BP
British Gas (QGC)
EPIC Energy
ERM
ExxonMobil
GLNG
Goldman Sachs
ICAP
Incitec Pivot
Infratil Energy Australia
IPRPLC GDF SUEZ
Jemena Pipelines
Macquarie Bank
Origin Energy
Rio Tinto
Santos
Stanwell
TRUenergy
Appendix 2: Detailed design

The establishment of the gas supply hub will facilitate the wholesale trading of natural gas between participants at Wallumbilla. The detailed design considered the standard trading, delivery and settlement arrangements required to support the establishment of the brokerage hub.

The detailed design was developed in consultation with the GSHRG between July and October 2012 across 18 discussion papers and 11 meetings. For the key detailed design topics of Trading, Delivery and Settlement the documentation and consultation of the detailed design was carried out over numerous discussion papers and meetings.

Spot Trading Products

Each product listed on the exchange will have a specific term and will relate to the delivery of gas to a specific location. Two core products to be listed on the exchange are the ‘Day-ahead’ and ‘Balance-of-day’ products.

*Day-ahead Product*

The standard delivery period (term) for the day-ahead product is a single gas day. The trading window for the day-ahead product will open 4 calendar days prior to the gas day and will close at the end of the trading day prior to the delivery day.

*Balance-of-day Product*

The trading window for a gas day will be extended into the gas day through the establishment of a separate ‘Balance of day’ trading product. This product will allow parties to manage their portfolio requirements closer to real-time and to manage imbalances within the gas day. Trading a ‘Balance of day’ product requires a lead time from the transaction to the start of delivery to allow trading participants to organise the delivery and receipt of the gas at Wallumbilla. As such the term of the contract will commence 1 hour after the transaction time and will finish at the end of the gas day.

A number of participants requested the inclusion of a confirmation process into the trade execution process to allow a trade to be cancelled in the event that the trader cannot organise the transportation of the gas. Other participants encouraged the development of products that give certainty of a transaction to traders once orders have been matched on the exchange. AEMO believes it is important for traders to have certainty of a transaction once it is executed through the exchange and as such does not propose the inclusion of a confirmation process in the terms of the balance-of-day product. Once a transaction is executed through the exchange the buyer and seller will be bound to the obligations specified in the exchange rules and the product terms and conditions.

Trading Location

The delivery location specified in the trading product is the physical point or points at which gas is delivered to and the point at which title transfers from a seller to a buyer. A trading location has been defined for each of the main pipelines connecting to the Wallumbilla hub. Trading products will link the delivery of gas to one of these standard trading locations.

The legal framework, for the exchange, will be structured in a way that simplifies the addition of additional delivery points, groups of delivery points, or to add new trading products depending on participant requirements. Where a new transmission pipeline connection occurs, a new product that specifies the relevant location can be readily added if deemed by the market to be an efficient point of trade.

Trading locations may be established as either a single delivery point representing one run into which sellers deliver to, and buyers can take gas away from or multiple delivery points that can be combined to represent one point.

The grouping of multiple delivery points into a trading location will require the implementation of additional processes including:
• Buyers must be able to receipt gas at all delivery points.
• Seller specifies the delivery point at time of transaction.
• The delivery point specified by seller will become the transaction delivery point.
• Buyer will nominate for the receipt of the transaction at the transaction delivery point.
• Title transfer will occur in accordance with allocation agreement for the transaction delivery point.

The benefit of multiple delivery points for a single product is that the more physical points that are referenced by a product, the greater the number of potential buyers and sellers that are able to trade that product. Over time this should encourage greater investment and augmentation at certain trading locations. Traders may potentially be more willing to trade in and around Wallumbilla if gas could be delivered to, or taken away from multiple points.

South West Queensland Pipeline (SWQP)
It is proposed to establish the following multiple delivery points on the SWQP as the location where products will trade:
• Run 6 Spring Gully receipt point - the interconnection of the SWQP and Spring Gully pipeline
• Run 9 Darling Downs receipt point - the interconnection of the SWQP and Darling Downs west pipeline.

Figure 6: SWQP Trading Location

Queensland Gas Pipeline (QGP)
It is proposed to establish the following multiple delivery points on the QGP as the location where products will trade:
• Run 3 SWQP receipt or delivery point - interconnection of the SWQP and QGP
• Run 10 SWQP receipt or delivery point - interconnection of the SWQP and QGP.
Roma Brisbane Pipeline (RBP)
It is proposed to establish the following multiple delivery points on the RBP as the location where products will trade:

- Run 3 RBP delivery point - the interconnection of the SWQP and RBP
- Run 4 RBP delivery point - the interconnection of the QGP and RBP
- Run 7 RBP delivery point - the interconnection of the RBP and Spring Gully pipeline.

Forward-Dated Products
For the purposes of this discussion, ‘forward-dated’ is considered to refer to any products due to commence delivery more than four calendar days from the date of trade execution. The GSHRG provided the following feedback to AEMO in relation to the potential benefits of forward-dated products.
- **Portfolio management around long term agreements:**
  Assist participants to balance their portfolio around long term agreements. For example, the adjustment of a portfolio for planned outages of plant or supply from gas fields.

- **Short to Medium term portfolio requirements:**
  A number of participants, both buyers and sellers, provided feedback that they see considerable value in the establishment of monthly contracts traded 6 to 24 months ahead of the delivery period as a tool for managing portfolio requirements over the short to medium term.

  Traditionally, industry has managed sale and purchase requirements through long term bilateral agreements. However, a number of participants noted this approach is likely to change in the near future with a smaller portion of portfolio requirements met by long term supply and transportation agreements.

  The development of a liquid forward trading market would allow buyers and sellers to replace a component of their long term gas requirements with forward-dated products that are transacted on a short to medium-term basis. For energy retailers, forward-dated products could be used to build up their supply portfolio to match seasonal variations in demand and would also provide the flexibility to adjust their supply portfolio in response to retail customer churn.

- **Transparent forward curve:**
  Liquid markets for forward-dated products would provide the industry with a transparent forward curve. A transparent forward curve could be used by industry as an input into trading, risk management and business development decision making.

**Forwards Products within proposed arrangements for the GSH**

The core trading products to be established for the gas supply hub are day-ahead products for trading locations at Wallumbilla. The trading, delivery and settlement framework established for the spot transactions as set out in this report can be leveraged to support the development of forward-dated products.

**Contract Tenor**

The ‘tenor’ of a contract refers to the time span covered by its nominal delivery period. e.g. a ‘day-ahead’ contract spans the next gas day. Forward trading could encompass:

- **Daily contracts:** These contracts would span a single gas day. They are functionally identical to the day-ahead contract, but for a later date.

- **Week-ahead contracts:** spanning all days in the week from the start of the next week.

- **Balance-of-month contracts:** spanning all remaining days in the current gas month.

- **Monthly contracts:** spanning a specified gas month, that could be used in a strip to create a quarterly or a yearly product.

As shown in the diagram below, the week-ahead and balance-of-month contracts could be traded as a strip of daily contracts or as a stand-alone product. The daily contracts for a specified day are fungible against each other, and thus positions can be netted. The majority of participants supported the use of a strip of daily contracts for the trading of forward-dated products. However, the netting benefit cannot be realised within the proposed framework as it requires the delivery of each contract.
Gas Delivery

Forward-dated products developed for the gas supply hub would require physical delivery of gas at the trading location as per the day-ahead products. The arrangements for the notification and settlement of delivery variations can also be utilised for the forward-dated products.

Forward-dated products would require the delivery of individual contracts as per the delivery obligations for the day-ahead product. To allow the netting of delivery positions across all spot and forward transactions (which may not be feasible for the commencement of the market) the delivery obligations for the forward-dated products must be identical to those of the day-ahead product.

Settlement & Credit Risk Management

AEMO would provide a central settlement and credit risk management service for the forward-dated products consistent with that proposed for the day-ahead contracts.

Settlement of the forward-dated products would occur after the end of the delivery period as part of the regular billing period settlement process. Credit support requirements would be assessed for buyers based upon the full contract value of the forward-dated products. Sellers would be required to set aside collateral at the time of the transaction to cover the credit risk associated with an increase in the market price of the product. The credit support requirements for the seller would be released prior to the commencement of the delivery period. The approach of deeming the transaction as delivered for the purpose of determining the credit support requirements would need to be amended so that the deeming occurred just prior to the commencement of the delivery period rather than at the time of the transaction.

Comparison to Spot Transactions

The nature and quantum of risks associated with trading forward products can differ from the spot transactions and as such there are a number of limitations for forward trading within the proposed trading, settlement and delivery framework of the gas supply hub. The key differences between the trading of spot compared to forward transactions include:
Movement in market price:
The likelihood of a change in the market price of a forward-dated product increases the longer the time period between the transaction and the delivery period. If a trader becomes insolvent prior to the delivery period then there will be a cost to the market to replace the transaction that the defaulting participant can no longer deliver.

Unplanned outages:
The GSHRG must consider whether the no Force Majeure (FM) approach for the day-ahead products is appropriate for the forward-dated products. Liquid day-ahead and balance-of-day markets will help parties to manage the risk of unplanned failures and hence reduce the need for FM provisions within the forward-dated products.

Limitations of model for Forward-dated products
Limitations for forward trading within the proposed trading, settlement and delivery framework of the gas supply hub are set out in this section:

Credit Risk Management
Credit support requirements, in particular those for buyers, would be based on the face value of the forward-dated transaction. If a participant has forward trades stretching a significant time span into the future, posting collateral equal to full contract value on each, the collateral requirements could become substantial. A participant though may not wish to deploy so much capital to support its longer-dated trades when it has the option of trading the same or similar products over-the-counter (OTC) and arranging credit bilaterally.

A more efficient approach to collateralisation is to determine credit support requirements based on an assessment of the risk of the participant's position – typically the potential losses which could be incurred, to a high degree of statistical likelihood (e.g. 99%) between when a contract was entered into and when it could be liquidated. This collateral is often referred to as 'initial margin' and is intended to act as a good-faith deposit to cover the participant's position. It usually goes hand in hand with an incremental settlement process, known as 'variation margining' or 'mark-to-market'. These are the core risk management processes of a clearing house acting as the central counter-party to all trading in the markets it clears. Just prior to the commencement of the delivery period the credit support requirements would revert to those of the day-ahead products, any margins no longer required would be released to the participant.

Gas Delivery
An alternative to the proposed delivery of contract positions would be to allow participants to deliver the net position across all contracts transacted for a particular product. Where the delivery obligations are the same for all product types the netting of delivery positions could be across all transactions for the same delivery period.

Under this model, only net positions at a given location are scheduled for delivery. If for example, A buys 10TJ from X, and sells 12TJ to Y, it would only need to deliver the net short position of 2 TJ. A would only be matched for delivery against another party at the conclusion of all trading, and would not even need to know the identity of X and Y (i.e. anonymous trading is preserved). The only party whose name it would need to know is the party it is matched with for delivery, which could be an altogether different party (or parties).

The delivery of net positions would provide administrative value to participants and would help to alleviate the concerns raised by APA Group in relation to on-selling of the gas on the RBP. The delivery of net positions would be required to encourage the participation of financial players in the market that have no capability of making or taking delivery.

1 Or when it was last 'marked-to-market', if variation margining is in use.
AEMO is currently considering the legal and regulatory implications of offering this service to the market.

**Participation**

The model proposed for the trading of forward-dated products would require participants to warrant that they have the necessary contractual rights to deliver or receipt gas at the trading location and would require each contract to be delivered at the hub. These requirements would exclude the participation of financial players that have no capability of making or taking delivery from the market. Financial players can be valuable providers of market liquidity.

**Financially settled products**

A number of participants expressed interest in financially settled products. Cash settlement amounts for financially settled products would be based on the differential between the transaction price and an underlying reference price – which could be derived from trading of the day-ahead product over the delivery period.

**Trading Platform**

To implement the gas supply hub AEMO will develop an exchange to allow the matching of buyers and sellers of gas. The exchange will be in the form of a trading platform that will include:

- Web based platform through which trading participants can access the exchange.
- Functionality to list multiple trading products, representing different trading locations and contracting periods.
- Ability for trading participants to post bids or offers for products, have those orders matched and provide confirmation of transactions to trading participants.
- A display of active orders and prices along with all recent trading history.

Trade at the gas supply hub will be voluntary and exchange-based, with buyers and sellers able to anonymously place bids (to buy) or offers (to sell) via the trading interface. The trading system then matches bids and offers on price to execute a trade. Figure 10 presents a screenshot of how the trading platform may look.

*Figure 10: Proposed trading screen*
The trading platform will support the following pre-trade, trade and post-trade processes:

**Pre-trade involves:**
- Order submission, update and withdrawal, including:
  - Bid offer format
  - Timing of submissions
  - Validation of order submission, changes and withdrawal

**The trade process involves:**
- Matching of orders

**Post-trade processes involve:**
- Communication of executed trades to trading participants
- Recording of executed trades (i.e. trade book management)
- Public reporting

**Order submission**
Participants will be able to submit orders (bids, offers) for each trading product (relating to the physical delivery of a quantity of gas). A sell order (offers) means that a participant is prepared to sell the offer quantity of gas for delivery at the trading location at a price equal to or greater than the offer price. A buy order (bids) means that a buyer is prepared to buy the bid quantity of gas for receipt at the trading location at a price equal to or less the bid price.

**Validation**
The trading systems will validate orders on submission performing the following checks:
- Orders are correctly formatted (the trading screen will enforce this), and
- Orders against the participant’s available credit

Once validated the trading system will provide the participant with confirmation that an order has been accepted or rejected. It is proposed that the system will have the functionality for trading participants to check on active orders they have submitted to the exchange.

**Format**
Trading participants will submit orders – bids (to buy) and offers (to sell) – for all products they wish to trade. All orders will remain anonymous on-screen until an order is matched and a transaction is completed.

Trading participants will submit orders to the trading system specifying the relevant product, the price and the quantity. The quantity will be a multiple of the minimum parcel size and will represent a quantity of energy to be delivered or receipted at the trading location.

**Quantity**
The minimum parcel size for the day-ahead product will be 1000 GJ.

The balance of day product will utilise an alternative implementation of the minimum parcel size where the terms of the minimum quantity will be defined as GJ/hour. This value will be 25 GJ/hour; hence a trading participant could transact a number of parcels of 25 GJ/hour and deliver that quantity over the remaining hours left in the day.

**Price**
Orders will be submitted to an accuracy of 0.01 $ / GJ which is considered of sufficient granularity for the transactions contemplated in this market.

It will also be possible, through the trading platform, to set minimum and maximum prices for orders on participant entry. The minimum price will be 0.00 $ / GJ.
Order Characteristics

Order characteristics will allow a participant to specify additional terms for the execution of an order for a gas day and product. Order characteristics will be subject to the functionality provided by the approved systems and processes of the market operator. This section outlines the order characteristics likely to be available to the trading platform for the gas supply hub.

Valid for a period

Participants will be able to apply characteristics to orders such that they are active for a specified period of time. After the validity period has lapsed the order will expire. For example, a participant will be able to enter an order that is only valid for a single trading day. Conversely an order could be valid until the close of the trading window for a specific product.

Valid to a set time

Participants will be able to apply characteristics to orders such that they are available for trade only up until the time specified for an order, after which the order will expire. This feature will allow participants to manage any specific nomination obligations in accordance with their GTA or GSA. For example a participant with a requirement to nominate by 3.00 pm may specify that a bid expires at 2.00 pm. This would allow 1 hour for the participant to receive a trade confirmation and organise the nomination to be made to the respective pipeline.

Iceberg

The iceberg characteristic allows a participant to enter an order with a portion of the order quantity not visible to other participants on the trading screen. As the order is matched, a further portion is made available to trade. The trading platform may also allow the extra quantity to be made available by the participant at a different price.

At Market

An order made “at market” is an instruction to execute a trade at current market prices. Any unmatched quantity associated with the order would be cancelled.

Timing of submissions

The gas supply hub will trade 7 days a week. Trading hours will be 9:00 a.m. to 5:00 p.m. (Eastern Standard Time).

The trading platform will operate the matching process in a mode of continuous trading through the trading hour windows. There will be a ‘pre-open’ period from 8:30 a.m. to 9:00 a.m. (Eastern Standard Time) where participants will be allowed to enter, amend or cancel orders prior to opening of the trading session.

Each product will have a set window for the submission of orders, defined in terms of:

- The number of calendar days-ahead that orders can be submitted (which may be different to the number of days-ahead that the product can be traded). It is presently proposed that orders for day-ahead gas be submitted up to four calendar days prior to the gas day (see Figure 11).
- The specific hours within a given day that orders can be submitted (which will be different to the hours within which matching actually occurs). It is proposed that the time window for order submission be 8:30 a.m. to 5:00 p.m. (Eastern Standard Time).

The submission window for the Day-ahead product will cease at 5 p.m. on the last calendar day prior to the gas day the product is trading. For the Balance-of-day product, the submission window would be 8:30 a.m. to 5:00 p.m. on the actual delivery gas day. All trading (matching) will cease on closure of the submission window for that product.
Handling of Unfilled Orders

If a participant does not specify the expiry time then an unfilled order (including the unfilled portion of partially filled orders) at the close of a trading day will carry over to the next trading day and will expire at the end of the trading window for that product.

Order changes and withdrawal

Participants will submit orders to the trading system specifying the relevant Product, order characteristics, price and quantity. The trading platform will allow participants to change or withdraw any un-matched orders.

Changes to Orders

Participants will be able to amend orders that remain un-matched in the trading system.

Order amendment will be permitted during the order submission windows (8:30 a.m. to 5:00 p.m. (Eastern Standard Time)).

Withdrawal of Orders

Participants will be able to withdraw unexecuted orders, and the unexecuted portion of partially filled orders. Orders may be withdrawn while the submission window is open on any business day.

Additionally, the market operator will be entitled to reject or withdraw any bid or offer where:

- The order, if matched (in full), would cause the Participant to exceed its trading limits;
- The Participant has already exceeded its trading limits; or
- The Participant has been suspended from trading.

Orders will lapse either at the time specified in the rules for a particular Product or at the time specified in the Order.
Matching of Orders

The market will match bids and offers for a given product.

We can illustrate the matching process through observing a bid and offer stack for a product being traded. These stacks are shown in Figure 12.

*Figure 12 Bid and Offer stack for product X.*

No matching is possible given the current status of the stacks. Seller C has the cheapest gas available for sale at $5 per GJ and buyer G is willing to pay the most for gas of the current buyers listed with a valid order at $4 per GJ. But at this point the bid remains $1 per GJ lower than Seller C’s offer.

If in the above example both parties amended their orders; seller C lowers its offer to $4.50 and buyer B raises its bid to $4.50 per GJ then the system would then match C’s offer with B’s bid and the trade would be executed. The executed trade would be for the quantity of 4 TJ at a price of $4.50 per GJ. The stacks post the executed trade are shown in Figure 13.

*Figure 13 Bid and Offer stack post trade for product X.*

The matching process will match bids and offers for a given product based on price/time priority:

- Orders are first matched based on price priority, with new offers matched against the highest price bid, and new bids matched against the lowest price offer.
- Where two or more orders for a product share the same price and are ‘in the money’, the order with the earlier submission time will be matched first.

There can be occasions where a bid and offer may overlap in price. Using the previous example, seller C may have an offer of $5 per GJ and buyer G submitted a bid at $6 per GJ. This may occur when orders are entered at the same time or when a participant intends to deal multiple orders at once.

Where a newly submitted bid is priced higher than an existing offer, the trade price will be the price of the first-entered order of that match, in this case the bid. This is detailed below:

To illustrate, consider the bid and offer stacks below in Figure 14. The stacks show that the parties closest to executing a match are seller C and buyer G, but there remains $1.00 to cross for a match to take place.

*Figure 14 Bid and Offer stack for gas day D, product X and trading location Y.*

Buyer D enters a bid for a 12 TJ quantity at a price of 7.00 $/GJ.

The following two matches will occur:

- Buyer D and Seller C match for 6 TJ @ 5.00 $/GJ
- Buyer D and Seller B match for 4 TJ @ 6.00 $/GJ

The unfilled 2 TJ from D sits in the bid stack at 7.00 $/GJ with the resultant order stacks now shown below in Figure 15.

Figure 15

<table>
<thead>
<tr>
<th>Seller</th>
<th>Qty (TJ)</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2</td>
<td>8.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Buyer</th>
<th>Qty (TJ)</th>
<th>Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>2</td>
<td>7.00</td>
</tr>
<tr>
<td>G</td>
<td>4</td>
<td>4.00</td>
</tr>
<tr>
<td>F</td>
<td>4</td>
<td>3.00</td>
</tr>
<tr>
<td>E</td>
<td>2</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Pricing off the first-entered order results in a matched price at each pre-existing offer price with any unmatched quantity remaining listed at the bid price.

This approach provides efficiencies for sellers and buyers when entering trades. Instead of a seller or buyer entering three separate orders at three different prices the submitting party can realise the same outcome with a single submission.

**Pre-open period**

As discussed previously there will be a ‘pre-open’ period from 8:30 a.m. to 9:00 a.m. where participants will be allowed to enter, amend or cancel orders prior to opening of the trading session.

Where participants are allowed to enter orders prior to opening of a trading session, and a number of bids and offers have accumulated there may be price overlap within the central order book. The gas supply hub like many markets will utilise an ‘opening procedure’, which matches the overlapping bids and offers received in aggregate at a single clearing price. This opening procedure will run at 9:00 a.m. just prior to the commencement of trading.

**Notification of executed trades**

Once a bid and offer is matched by the system the counterparties to the trade will be notified that a trade has been executed through a trade confirmation process.

The notification will be sent to registered participants’ designated contacts and could be communicated by email and SMS. The trade confirmation will contain the following details:

- Product (including the delivery point) and gas day
- Transaction price and quantity
- Date and time of trade execution
- Trade counterparty
- Contact details of counterparty

In addition to email and SMS notifications, each participant will also have access to a report detailing all its confirmed trades over a defined period. This report will be updated for each confirmed transaction.

Display active bids and offers and recent trading history

Participants will be able to view all trading information pertinent to the products they are permitted to trade.

**All participants**

The trading screen will allow participants to view the following information for each location and product:
• Current bids and offers (2 or 3 nearest to matching price for each product) including price and quantity
• The last transacted price for that product and gas day
• High or low price for the day (or submission window)
• Aggregate quantity traded for the day (or submission window)

Participants will also be able to access and retrieve through the trading platform a full list of orders (price and quantity) current for a product and gas day. Participants will also be able to review all previous trades (quantity and price) for a product and gas day.

**Individual Participants**

Participants will be able to view their own data on each gas day, such as:

• Current bids and offers for each product
• Previously executed trades for a product
• Current trading position versus collateral posted with the market operator

**Delivery**

**Delivery of Hub Transactions**

Participants will be responsible for the delivery of hub transactions and will utilise existing delivery arrangements to meet their delivery obligations.

**Authorisation**

Buyers and sellers will warrant that they have a contractual right to deliver or receipt gas at the trading location.

**Buyers:** must have the right to transport gas on the pipeline relevant to the trading location and will be a party to the allocation agreement at the pipeline receipt point.

**Sellers:** could be a gas producer or shipper with the right to have gas delivered to the trading location a under GSA or GTA. A gas producer on an upstream facility delivering gas into the pipeline will have an interconnection agreement with the pipeline operator.

**Hub Trading**

Trading participants will be authorised to submit buy and sell orders for physical gas products on the trading platform. When buy and sell orders are matched by the exchange the buyer and seller receive a Trading Notification.

The participants will then use existing contractual arrangements to facilitate the delivery of gas as outlined the figure below:
Nominations

Participants must make nominations under their existing supply and transport agreements to facilitate the delivery of gas at Wallumbilla.

- The buyer makes receipt point (point at which gas enters the pipeline) and delivery point (point at which gas is redelivered to the Shipper by the pipeline operator) nominations.
- Nominations by the seller for the delivery of gas from an upstream facility to the trading location.

Delivery

The pipeline operator will schedule gas based on the nominations it receives from shippers and in accordance with contractual rights and priorities. The pipeline operator transports gas on the day to meet the pipeline schedule.

After the end of the gas day the pipeline operator will calculate physical receipts and deliveries using Custody Transfer Point (CTP) meter data. The physical quantities delivered are allocated amongst users at the receipt and delivery points using either an agreed allocation methodology (by all shippers at that receipt point) or the pipeline operator’s default methodology (pro-rata).
The receipt point allocations are the primary input to the GSA and GTA billing processes and will used by participants to determine delivered quantities against hub transactions.

- The pipeline operator provides its shippers with receipt point allocations. The pipeline operator invoices shippers for gas transportation services based on receipt point and delivery point allocations.
- The pipeline operator provides an interconnecting party (seller) with the total delivered quantity at the receipt point. Where the seller is a shipper on a connecting pipeline the operator of that pipeline with provide its shippers with a delivery point allocation.
- The gas supplier prepares the GSA invoice based on the total delivered quantity and in accordance with the relevant allocation methodology.

Participants will determine the delivered quantity against a hub transaction based on GTA and GSA billing information.

Key delivery terms and conditions

Uniform delivery

Participants will deliver and take receipt of gas uniformly across a gas day. Parties may agree bilaterally, with the confirmation of the relevant pipeline operator, to amend the delivery profile so that more of the transaction quantity is delivered at specific intervals within the day.

Gas quality and pressure specification

Participants must deliver physical gas to meet the pressure and quality specified in the product terms and conditions. The gas quality specification can vary across the different pipelines connecting at Wallumbilla and as such the specification will be documented separately in the terms and conditions of each trading product.

As set out in the Exchange Rules Outline, the delivery of off-specification gas must be notified to the Buyer and the Buyer can either accept the gas or reject it. If the Buyer accepts off-specification Gas then the Seller is taken to have made the gas available for delivery. If the Buyer rejects off-specification gas, the Seller is deemed to have failed to make gas available for delivery.

Delivery variance

The actual quantities receipted into the pipeline are allocated between the shippers under the allocation agreement for that receipt point. There are no balancing services currently offered on the pipelines connecting at Wallumbilla and as such the actual volume of gas physically delivered at a trading location can vary from the Buyer and the Seller’s nominations (transaction volume).

Under or over delivery could arise from:

- gas production issues.
- failure to make appropriate nominations by the seller.
- curtailments by the pipeline on gas delivery.

Failure to receipt could arise from:

- curtailments on the pipeline from Wallumbilla.
- failure to make appropriate nominations.

Settlement of Delivery Variance

Regular settlement of the market will be unaltered, with exchange transactions settled based on transacted quantity. If AEMO is notified by the trading parties that the delivered quantity is not equal to the transaction quantity then AEMO will adjust the settlement of each of the parties through separate delivery variance charges and payments.
As shown in Figure 4, the calculation of the delivery variance charges and payments will depend on the amount by which the delivered quantity varies from the transaction quantity.

1. **Delivered quantity within tolerance**: Delivery variance quantity is settled at the transaction price.

2. **Delivered quantity outside of tolerance**: Delivery variance quantity is settled at the transaction price plus an amount to compensate for the delivery failure.

**Figure 12: Delivery variances**

The option to settle a delivery variance through the market will be available to participants for three months (cut-off) after the delivery gas day.

**Delivery tolerance**

If the delivered quantity is within the delivery tolerance then the under or over delivery of gas will be settled at the transaction price.

A fixed delivery tolerance, which will be applied to the Transaction Quantity, of 5% is proposed for all of the trading products.

**Delivery outside of tolerance**

If the delivered quantity is outside of the delivery tolerance then the under or over delivery of gas will be settled at the transaction price and the defaulting party will pay an additional charge to their counterparty to compensate for a breach of their delivery obligation.

The additional charge will be based on a fixed rate of 25% of the transaction price and will be payable on the variation between the delivered quantity and the transaction quantity.

The delivery payment and charge settlement mechanism within the Exchange Rules will be the only remedy available for a breach of a participant’s delivery obligations. The fixed compensation mechanism may under or over compensate a Participant for their actual direct costs associated with the delivery default. However, the fixed compensation mechanism will provide greater...
certainty of the trading risks to participants prior to entering into a hub transaction and would be simpler to administer than the determination of damages on a transaction by transaction basis.

**Worked Example: compensation for delivery outside of tolerance**

This example is based on a hub transaction where Participant A sells 10,000 GJ of gas to Participant B at a price of $5 / GJ.

**Transaction Payment**

- Participant A will receive a hub transaction payment of $50,000 from Participant B.

**Delivery Variance**

- Participant A (seller) is not able to deliver the contract quantity to Participant B (buyer). Receipt point allocation for Participant B is 2,000 GJ lower than its nomination.
  
  - Participant A must pay back for the gas it did not deliver to the hub.
    
    = Delivery Variance Quantity x Transaction Price
    
    = 2,000 GJ x $5/GJ
    
    = $10,000
  
  - Delivery tolerance is equal to 500 GJ (5% of 10,000GJ)
  
  - Delivery variance of 2,000 GJ is outside of the tolerance (500GJ). As a result, Participant A must make pay delivery variance charge to Participant B.
    
    = Delivery Variance Quantity x Transaction Price x Compensation Rate.
    
    = 2,000 (GJ) x $5/GJ x 25%
    
    = $2,500
  
  - Overall, Participant A is paid a total of $37,500 by Participant B for the 8,000GJ it delivered to the hub.
    
    = Hub transaction payment less delivery variance charge less delivery variance compensation.
    
    = $50,000 - $10,000 - $2,500
    
    = $37,500

**Exemption from compensation payment for delivery outside of tolerance**

It is proposed that in the event a delivery default is caused by a third party operational issue on the pipeline that the delivery variance settlement will not include the compensation component.

1. **Compensation will not be payable in the event that gas cannot be receipted due to a pipeline operational issue**

A pipeline operational issue, as notified by Pipeline Operator to shippers and interconnect parties, will not result in a compensation payment for the buyer or seller.

A pipeline receipt issue that is caused by the buyer, for example a failure to submit a nomination, would still require the buyer to make a payment to the seller.

2. **Compensation will not be payable in the event that a Pipeline Operator has instructed the supplier to amend its deliveries into the pipeline.**

In the event that a Supplier has amended its deliveries into the pipeline at the request of the pipeline operator to maintain system security the seller will not incur a charge.
In both scenarios outlined above the primary evidence of the exemption is the notification issued by the relevant Pipeline Operator. As such, the buyer and seller must maintain records of the notifications provided to them by the Pipeline Operator.

**Determination of delivered quantity**

Under the brokerage hub model the pipeline operators do not provide allocations to the market operator. The allocation information provided to shippers by the pipeline operator, and any subsequent sub allocations, will be the basis for determining the delivered quantities for transactions executed on the exchange.

Buyers and sellers will need to maintain a record of allocated quantities from the pipeline operator so that the delivered quantities notified to the market can be verified in the event of a disagreement on the delivered quantities by the trade counterparties.

**Allocation principles**

The trading locations proposed for the gas supply hub are points where gas is injected into the pipeline by a gas producer on a connecting facility or a shipper on a connecting pipeline. As shown in the figure below, at each of the trading locations there will be allocation principles used to determine the quantities:

- **Delivered:**
  - Gas producer: A set of Gas Sale Allocation Principles will be used by the producer when billing the sale quantities of gas.
  - Pipeline operator: The pipeline operator of a connecting pipeline will maintain a set of delivery point allocation principles which are an input into the billing of services on that connecting pipeline.

- **Received:** The pipeline operator maintains a set of allocation principles. It is expected that the receipt point allocation principles are consistent with the related delivery point allocation principles.

*Figure 13: Gas allocation principles*

Analysis of potential trading scenarios showed that in most cases both the buyer and the seller will have the necessary information required to determine the delivered quantity. In some more complicated trading scenarios (for example, where there are many buyers, sellers and transactions) the specification of a number principles will assist parties to determine the delivered quantity. The proposed principles and the obligations for the determination of the delivered quantity will be documented in the Exchange Rules.
Principles for determination of delivered quantity

The principles include:

1. The allocation of a delivery variance to a hub transaction must be consistent with the allocation principles of the applicable receipt point on that gas day.
   - For example, if the prevailing methodology is to allocate on a pro-rata basis then the delivered quantity should also be shared pro-rata between hub transactions and other bilateral transactions.

2. Where the prevailing allocation principles are based on a priority system then the assignment of a delivery variance should also be priority based.
   - For example, where there are multiple transactions between the same buyer and seller, for the same product and gas day then the transactions will be deemed to be delivered in order of the time of transaction.

Obligations relating to the determination and notification of delivered quantity

1. The buyer or the seller will have the right, but not the obligation, to submit the delivery data soon after the end of the gas day.

2. If after the end of a billing period a participant is aware that it hasn’t delivered the transaction quantity in full then it will endeavour to remedy that breach with the counterparty or notify AEMO of the delivered quantity.

3. AEMO will facilitate the payment of compensation between the parties up until 3 months after the relevant delivery gas day.

Communication of Delivered Quantity Information

AEMO will develop a web-based interface (as shown in Figure 15) to the market systems that will allow participants to communicate the delivered quantity against hub transactions so that compensation for a breach of delivery obligations can be settled via the hub trading and settlement system.

Process for the submission of delivery data

AEMO will not receive allocation data directly from pipeline operators and other data providers. The delivered quantities used in settlement will be communicated by Participants. A simple process has been developed that allows participants to submit, confirm and correct delivered quantities for settlement under the exchange rules. It is proposed that the process is built into the Trading and Settlement System so that the delivery variance can be settled automatically by AEMO.
**Figure 14: Process supporting settlement of delivery variance**

![Flowchart showing process steps](image)

**Table 2: Description of settlement process steps**

<table>
<thead>
<tr>
<th>Process Step Number</th>
<th>Description of Process Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>For all trades executed on the exchange AEMO will determine the settlement amounts for the Physical Gas Payment and Charges. The settlement amount is equal to the product of the Transaction Price and Quantity.</td>
</tr>
</tbody>
</table>
| 2.                  | After the end of the delivery gas day, participants will determine the actual delivered quantity based on data provided by the relevant pipeline operator or gas producer. Participants can elect to settle the delivery variance:  
  - **Off-market:** for example, participants with an existing GSA may choose to make up a delivery shortfall with a physical payback of gas.  
  OR  
  - **On-market:** AEMO will adjust the settlement amounts of the participants for the amount of the delivery variance settlement. |
<p>| 3.                  | Participants can inform the market operator of a decision to settle the delivery variance off-market via the Trading System. No delivery variance payment and charge will be determined in respect of that hub transaction. When determining the credit support requirements of traders a seller will not be given credit for the full transaction value until the delivered quantity is confirmed by both parties to a trade. If the parties confirm that the delivery variance will be settled off-market then AEMO will treat the transaction as being delivered in full and will as a consequence release any credit support held for the seller to cover the risk of a delivery variance |</p>
<table>
<thead>
<tr>
<th>Process Step Number</th>
<th>Description of Process Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Either participant can bring the delivery variance to the market for settlement by notifying AEMO the details of the delivery event via the Trading System. The details that must be submitted by a participant are outlined in section. The settlement representative for each participant will be issued with a notice by the Trading System setting out the data submitted.</td>
</tr>
<tr>
<td>5.</td>
<td>If Participants do not agree on the details of the delivery default event then they can trigger the Dispute Resolution Process. The dispute resolution process commences with an informal process between representatives of the buyer and the seller.</td>
</tr>
<tr>
<td>6.</td>
<td>Participants will submit and confirm details of the delivery event via the Trading System. The proposed web interface that participants will use to communicate the details of the delivery data is presented in section.</td>
</tr>
<tr>
<td>7.</td>
<td>Once details of the delivery event have been confirmed AEMO will settle the Delivery Variance Payment and Charge in the next available billing period.</td>
</tr>
</tbody>
</table>

**Interface for submission of delivery data**

AEMO will develop a web interface to the Trading and Settlement System that will allow the submission of the following delivery event details against a hub transaction:

- **Settlement Off-market:** Parties can notify AEMO of a decision to settle a delivery variance off-market. Confirmation that settlement of the delivery variance will occur off-market will allow AEMO to release the collateral requirements held in respective of the non-delivery risk for that transaction.

- **Delivered Quantity:** The quantity of gas delivered to the trading location. The delivered quantity submitted and confirmed by the participants will be the basis for the settlement of a delivery variance.

- **Payment of Compensation:** If the delivery default event is due to a third party operational issue at the trading location then compensation will not be payable on the hub transaction. In addition to this exemption, the parties may agree that no compensation will apply to a particular transaction.

- **Delivery or Receipt Issue:** If a penalty is to apply to the transaction then the parties will need to submit and confirm the cause of the delivery variance.
Breach of delivery obligations

Exchange transactions create an obligation for the seller to make gas available to and for the buyer to take gas away from the relevant delivery point. A failure to deliver can result in a direct cost to the non-defaulting party and the repeated default by a participant will undermine confidence in the product traded and the market.

Repeated failure to meet the delivery obligations could result in the suspension of a participant from trading in a specific product or for all products on the exchange. A notice will be triggered where the failure to meet delivery obligations by a participant exceeds a pre-determined number of occasions where the variance is (at least) 50% of the transaction quantity in a specified period. The trigger for suspension would be in accordance with the following process:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEMO Actions</td>
<td>Issue notice to the participant that provides a warning with relation to delivery breaches. AEMO will amend delivery margin parameter to zero. This will have the effect of treating all sales by the participants as not being delivered for the purpose of determining their credit support requirements.</td>
<td>Issue notice to the participant that provides a 2nd warning. AEMO will maintain delivery margin parameter to zero.</td>
</tr>
<tr>
<td>When</td>
<td>Immediately on trigger event</td>
<td>Immediately on trigger event</td>
</tr>
<tr>
<td>Period of increased collateral</td>
<td>The greater of 2 months or the remedy detailed below</td>
<td>The greater of 4 months or the remedy detailed below</td>
</tr>
<tr>
<td>Required Remedy</td>
<td>Participant provides proof that they can fulfil obligations under the rules and product specs.</td>
<td>Participant provides proof that they can fulfil obligations under the rules and product specs.</td>
</tr>
</tbody>
</table>
Settlement and credit risk management

The centralised settlement model proposed for the Gas Supply hub will leverage settlement arrangements for the existing markets operated by AEMO.

Settlement model

The centralised settlement model will involve the collation of transactional information from the trading system and delivery information from Participants, the calculation of settlement amounts, and the issue of statements to participants.

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Participant continues to breach delivery obligations</td>
<td>Proceed to step 2</td>
<td>Proceed to step 3</td>
</tr>
</tbody>
</table>

Inputs to Settlement

Settlement will be based on physical gas transactions and the quantity of gas delivered to the hub:

- **Hub Transactions**: price and quantity at which physical gas products are transacted at.
- **Delivered Quantity**: quantity of physical gas delivered to the hub.

Settlement Components

Settlement of trading activity within the Gas Supply Hub will comprise of the following settlement components:

**Physical Gas Payments and Charges**
- Face value of the transactions executed on the exchange.
- Product of transaction price and quantity.

**Delivery Variance Payments and Charges**
- Optional settlement item that facilitates the transfer of compensation between the buyer and seller for a variation between the transaction quantity and the delivered quantity.
- Product of transaction price and delivery variance quantity. If the delivery variance quantity is outside of the tolerance then the settlement is adjusted so that the defaulting party compensates their counterpart.
Transaction Fees

- Product of the aggregate quantity of transactions executed during a billing period and the transaction charge.

Settlement Process

The settlement process for the Gas Supply Hub is consistent with the existing processes used by AEMO for other markets and consists of the following steps:

1. Receive information from the trading system, specifically details of each trade to be settled.
2. Receive information from buyers and sellers regarding the actual delivery of energy against a trade.
3. Calculation of settlement amounts.
4. Preparation and issuance of statements to all participants. Electronic issuance of statements through a common interface with existing AEMO-operated markets.
5. Electronic distribution of supporting data used in the settlement calculation for the purposes of participant reconciliation.

Settlement Statements

**Daily**: settlement will be calculated each business day based on the most up to date information of hub transactions and delivered quantities. The daily settlement calculation will support the monitoring of credit risk positions across the market. Settlement amounts and quantities will be reported to Participants each business day.

**Preliminary statement**: will be provided for information purposes only, and allows trading participants to query values before the statement is finalised.

**Final statement**: is a financial commitment, and must be settled based on the stated value even if there is a dispute regarding the statement.

**Revised statement**: captures any change in settlement amounts since the Final statement was issued. It is proposed that revised settlements are performed 3 months after the Final settlement of a billing period. Adjustments identified in the Revised statement are to be included (credit or debit) in the next available Final statement.

*Figure 16: Settlement and billing timetable*
Billing Model

The billing model represents the process and timing by which participants are invoiced and remitted. Invoicing will be performed through the issuance of Final statements, which collate trading amounts for a defined billing period.

- The billing period: the amount of time over which trading amounts are aggregated. The proposed billing period for the gas supply hub is a calendar month.
- The payment period: the elapsed time after a billing period has finished until payment is required. A payment period of 20 business days is proposed for the gas supply hub.

As shown in the table below, the billing and payment periods for Gas Supply Hub is consistent with other markets AEMO currently operates:

Table 3: Billing and Payment Periods

<table>
<thead>
<tr>
<th>Market</th>
<th>Billing Period</th>
<th>Payment Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Supply Hub</td>
<td>1 calendar month</td>
<td>20 business days (approx. 1 month)</td>
</tr>
<tr>
<td>Victorian Declared Wholesale Gas Market</td>
<td>1 calendar month</td>
<td>20 business days</td>
</tr>
<tr>
<td>Short Term Trading Market</td>
<td>1 calendar month</td>
<td>20 business days</td>
</tr>
<tr>
<td>National Electricity Market</td>
<td>1 week (Sunday to Saturday)</td>
<td>20 business days</td>
</tr>
</tbody>
</table>

Consistent with other AEMO-operated markets the payment of invoices will be intra-day, with participants paying AEMO in the morning, and payments from AEMO to participants in the afternoon.

Credit risk management

Consistent with the centralised settlement model, it is proposed that credit risk will be managed centrally as a service provided by the market operator. Under a centralised model the risk of a payment default is borne by all traders that are owed money by the market. Credit risk associated with the gas supply hub will be managed separately from other markets operated by AEMO.

The market operator will require participants to post collateral to cover the potential settlement exposure associated with their hub transactions to minimise the risk of payment default on the regular payment of participants by the market. Unsecured credit will not be accepted from any entity, regardless of credit standing or rating as is the approach in other markets operated by AEMO.

In the event of a payment default AEMO would make a call on that participant’s collateral so that it can meet the payments to traders that are owed money from the market. Any residual shortfall would reduce the payments to traders on a pro rata basis as per the STTM and the DWGM.

The settlement exposure associated with hub transactions is made up of the following components:

- **Hub transactions**: transactions entered into on the exchange create an obligation for the buyer to pay for gas in the month after the gas is due for delivery.
- **Delivery variance**: Participants can elect to bring a variance between the transaction quantity and the delivered quantity to the market for settlement.
- **Transaction fees**
A participant’s trading limit will be derived from the amount of collateral they have posted with the market operator for the gas supply hub. The trading platform will validate that a new order does not cause a participant to breach their trading limit at the time an order is submitted.

Trading position

The trading position for a participant is the aggregate of all trading amounts that have been entered into but not yet invoiced and paid.

The following rules will be followed in the determination of the participant trading position:

- **Netting**: will be applied for the same product and associated delivery gas day.
- **Deemed delivery**: day-ahead transactions will be deemed to be delivered at the time of the transaction.
  - Buyers: exposure will be calculated based on the assumption that 100% of the transaction quantity is physically receipted at the hub.
  - Sellers: exposure will be calculated based on the assumption that 85% of the transaction quantity is delivered to the hub.

If the trading window for the day-ahead contract is extended to be more than the 4 days then the deemed delivery will occur prior to the start of delivery gas day rather than at the time of the transaction.

The actual delivered quantity will be used in the determination of the trading position once the delivered quantity is confirmed by the Participants.

As the credit risk will be monitored in real-time it will not be necessary to maintain a margin for hub transactions that could be entered into between credit assessments. If the selected IT implementation cannot facilitate the real-time monitoring of trading positions then this requirement will need to be reassessed.

Timing of prudential assessment

Prudential assessments will be performed each business day to assess the trading position of each participant against the level of collateral provided, and determine if further collateral is required.

The trading position across hub transactions and deliveries will be determined once a day within the settlement and credit risk management system. The trading position will be updated during the course of the day with any new transactions entered into by the participant.

A participant will not be permitted to submit new trading orders if their trading position exceeds their trading limit and the participant will be issued with a notice requesting them to post additional collateral with the market. A failure to post additional collateral with the market operator in accordance with the specified terms of a margin call could result in the suspension of the participant.

Form of collateral

The primary mechanism for providing collateral in AEMO’s existing markets is credit support, which is an unconditional bank guarantee from an authorised financial institution or state-owned treasury. AEMO has a single financial guarantee pro forma for use in existing gas and electricity markets and all guarantees must be in the prescribed format.

Treatment of cash

Where cash is provided to AEMO, it can be considered to reduce the trading position of a participant. It is proposed that cash will be treated as a security deposit. As such, it will not be considered a payment for goods or services, but is a made by the participant as a bond against future liabilities.
Electronic Funds Transfer

The electronic transfer of funds is required to support the following functions:

- The clearing of the market as defined in the billing model.
- The management of prudential obligations where the provision of cash is supported.

AEMO currently uses the Austraclear system for all the markets it operates, as defined in the AEMO Market Clearing Procedure. This system provides real-time gross settlement of transactions and is widely used in the energy industry for settlement of OTC transactions.

AEMO may suspend a participant if its settlement exposure is above its financial trading limit or where it defaults on a payment obligation.

Breach of financial obligations

Calculated exposure above financial trading limit

Under the prudential model AEMO will calculate settlement each business day for the purpose of monitoring the trading position of each participant. If a participant’s exposure exceeds their financial trading limit then AEMO will carry out the steps set out in the table below:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEMO Actions</td>
<td>Do not allow submission of new orders and suspend open orders not yet traded</td>
<td>Issue margin call notice</td>
</tr>
<tr>
<td>When</td>
<td>Immediately</td>
<td>Within 2 Business day after limit breached</td>
</tr>
<tr>
<td>Period the participant has to respond</td>
<td>Within 2 Business days</td>
<td>1 Business day</td>
</tr>
<tr>
<td>Required Remedy</td>
<td>Provide cash deposit or increase bank guarantee</td>
<td>Provide cash deposit or increase bank guarantee</td>
</tr>
<tr>
<td>If Participant fails to remedy</td>
<td>Proceed to step 2</td>
<td>Proceed to step 3</td>
</tr>
</tbody>
</table>

Payment default

If a participant fails to make a payment due in relation to an invoice for the supply hub then AEMO will take the following steps:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEMO Actions</td>
<td>Issue notice to participant</td>
<td>Draw down collateral, and Do not allow submission of new orders and suspend open orders not yet traded.</td>
</tr>
<tr>
<td>Participant given opportunity to pay amounts outstanding and re-instate collateral</td>
<td>Suspend participant with the payment of any outstanding amounts to be recovered</td>
<td></td>
</tr>
<tr>
<td>When</td>
<td>Immediately</td>
<td>1 hour after notice</td>
</tr>
<tr>
<td>Period the participant has to respond</td>
<td>1 hour</td>
<td>Next Business day after non-payment</td>
</tr>
<tr>
<td>Required Remedy</td>
<td>Pay invoice</td>
<td>Pay outstanding amount and re-instate collateral</td>
</tr>
</tbody>
</table>
Market information

Distribution of Information

Public Information

Trades on the exchange (quantity and price) will be published in real time so participants can observe how the market is trending on a particular day. A weighted average price for the trading day will be published at the end of each day.

Transparency of the following market information will be an integral part of the supply hub design so that parties who wish to analyse prices or trading activity for any one product or across all products at the supply hub can do so in a timely fashion.

This information in this category will be provided on an aggregate basis covering the wholesale trading of gas through the hub.

The information that will be provided to the public is outlined in the table below.

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Report Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trading Information</strong></td>
<td>Aggregate energy quantities &amp; value ($) traded for each product</td>
</tr>
<tr>
<td></td>
<td>• For a trading day</td>
</tr>
<tr>
<td></td>
<td>• For the exchange collectively</td>
</tr>
<tr>
<td></td>
<td>High and low price, opening and closing price of the day for each product</td>
</tr>
<tr>
<td></td>
<td>Average prices for each day-ahead product</td>
</tr>
<tr>
<td></td>
<td>• Volume weighted average price for the day</td>
</tr>
<tr>
<td></td>
<td>• Volume weighted average price for the month</td>
</tr>
<tr>
<td><strong>Organisations</strong></td>
<td>Participants registered at the exchange</td>
</tr>
<tr>
<td></td>
<td>• Company details</td>
</tr>
</tbody>
</table>

Participant Information

Participants will use the following information to monitor supply hub activity throughout the trading day. The majority of this information will be made available to participants through the trading screen.

The information that will be provided to participants is outlined in the table below.

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Report Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trading Information</strong></td>
<td>All current orders for each product, including price and quantity</td>
</tr>
<tr>
<td></td>
<td>Matched trades by product and delivery day</td>
</tr>
<tr>
<td></td>
<td>Current price (including price spread) and volume traded by product and delivery day</td>
</tr>
<tr>
<td></td>
<td>Trading system notices (if any)</td>
</tr>
<tr>
<td></td>
<td>Listing of pipeline capacity for trade by participants</td>
</tr>
</tbody>
</table>
**Private Information**

Participants will access their own ‘confidential’ information to track their current position within the market and manage their trade book.

Information issued to each participant containing their confidential company specific information may include the types outlined in the table below.

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Report Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trading Information</td>
<td>The participants current orders for each product (pre-trade)</td>
</tr>
<tr>
<td></td>
<td>Executed trades including confirmation details:</td>
</tr>
<tr>
<td></td>
<td>• Counterpart</td>
</tr>
<tr>
<td></td>
<td>• Price, quantity</td>
</tr>
<tr>
<td></td>
<td>• delivery point</td>
</tr>
<tr>
<td></td>
<td>Current trading position versus collateral posted with the market operator</td>
</tr>
<tr>
<td></td>
<td>• Prudential position</td>
</tr>
<tr>
<td></td>
<td>• Credit guarantee level</td>
</tr>
<tr>
<td></td>
<td>Orders cancelled by system (trading limit reached)</td>
</tr>
<tr>
<td>Organisational details</td>
<td>Contact details provided through registration, such as:</td>
</tr>
<tr>
<td></td>
<td>• Transaction conformation contact</td>
</tr>
<tr>
<td></td>
<td>• IT contact to approve new logins &amp; users</td>
</tr>
<tr>
<td>Delivery Information</td>
<td>Executed transactions post delivery date:</td>
</tr>
<tr>
<td></td>
<td>• Executed trade quantity and delivered quantity sorted per product and delivery day</td>
</tr>
<tr>
<td></td>
<td>Where quantities vary from transaction quantity:</td>
</tr>
<tr>
<td></td>
<td>• Quantities requiring confirmation by the participant</td>
</tr>
<tr>
<td></td>
<td>• Quantities awaiting confirmation from the counterparty</td>
</tr>
<tr>
<td></td>
<td>For those confirmed:</td>
</tr>
<tr>
<td></td>
<td>• Transaction quantity and delivered quantity sorted per product and delivery gas day.</td>
</tr>
<tr>
<td></td>
<td>• Quantities confirmed by tolerance level</td>
</tr>
<tr>
<td>Settlement Information</td>
<td>Provisional, final and revised settlement statements</td>
</tr>
<tr>
<td></td>
<td>Settlement supporting data</td>
</tr>
<tr>
<td></td>
<td>Settlement version</td>
</tr>
</tbody>
</table>
Publication of Information

Timing of Publication

It is proposed that the information will be available at set times depending on the requirements from participants and non-participants.

- **Real time** – Pre-trade and trading information for participants will be available real time through the trading system and will cover information such as order and trading position management.

- **End of the Trading Day** - Some of the information (both public and private) will be made available at the end of the trading day. This information will include daily summaries of prices and quantities.

- **End of the Billing Period** - Settlement information for participants will be provided at the end of the billing period.

Method of Publication

It is envisaged that the majority of market information outlined in section X will be available to Participants through the trading system. This information will be available to participants through a number of formats.

Information will be communicated through the following mediums:

- **AEMO website**: Public information will be available on the AEMO website. Updating of this information will occur at the end of the trading day

- **Trading system**: The majority of real time information will be provided through the trading system.

- **Secure login to AEMO**: This may be through the trading system (or through a separate interface) and provide participants access to prudential and delivery information.

- **Settlement direct**(used currently for participants to view NEM settlement statements): Settlement statements and support data may be made available through the settlement direct interface.

- **Reports for participant data**: This will follow the same approach as that adopted for the other markets, providing CSV reports via FTP and a Web interface. The reports will be time and/or event triggered.

Index Calculation

The calculation of trading indices for the gas supply hub will provide transparency of the wholesale price of gas traded at Wallumbilla. The creation of trading indices will also support the development of trading products for the short to medium management of gas price risk by industry participants. While AEMO is not proposing to establish financially settled products on the exchange, the creation of a reference price would allow traders to develop new products for managing their gas price risk.

A simple average price based index may be sufficient for initial implementation at the gas supply hub. The calculation of a simple average price index will be based on a progressive approach over time:

- **Weighted average price**: The weighting applied to each transaction price may be trade (each transaction has equal weighting regardless of the quantity) or volume (transaction quantity) weighted.

- **Product types**: The index may include all trades for a particular gas day - from the commencement of the trading window for the day-ahead product (proposed to be 4 calendar days) through to the close of trading. Alternatively, the on-the-day trades may be excluded from the calculation of the index prices.

- **Trading nodes**: An index could be created for each of the trading products or there could be a single index created for all trades at Wallumbilla.
• *Gaps in trading data:* It is proposed that the day-ahead product will be available for all gas days including Saturday, Sunday and public holidays. To allow the calculation of an index price for all gas days may require rules to guide the calculation in the event that there are no trades for a particular gas day. The index price may, in the absence of a transaction, be based on the closing buy or sell prices (mid-point) or the index price for the previous gas day.

The development of the index as a reference price for trading may require a more rigorous approach to the collection of trading information and the calculation of the index. This development is expected to take place post market start.
Market operation

Operating days & hours of the exchange
The gas supply hub will trade and be available to participants on a 7 day a week basis.

- Orders may be submitted on any day of the week (including public holidays) between 8:30 a.m. to 5:00 p.m. (Eastern Standard Time).

- Trading will occur on any day of the week (including public holidays) between 9:00 a.m. to 5:00 p.m. (Eastern Standard Time).

In conjunction with order submission the supply hub will also operate a 'pre-open' period from 8:30 a.m. to 9:00 a.m. (Eastern Standard Time) where participants will be able to enter, amend or cancel orders prior to opening of a trading session.

All trading (matching) will cease on closure of the submission window for a product.

Settlement services provided on working days
Settlement services, including the daily settlement calculation and prudential assessments, will be performed on business days only.

If a participant breaches its trading limit over the weekend then it will need to wait until the next business day to post additional collateral so that it can resume trading.

The daily settlement calculations will use the latest exchange transactions and delivered quantities confirmed by Participants. Participants will be issued settlement reports each business day that detail their exchange transactions, delivered quantities and indicative settlement obligations.

Support available to Participants
The AEMO Information and Support Hub will provide an information and helpdesk service to participants and the public regarding gas supply hub market operations.

The Information and Support Hub will also assist Participants with the resolution of operational IT related problems, including installation of, and systems administration support for AEMO supported systems.

Support for IT related problems will be available 24 hours, 7 days a week through the Support Hub number.

Working days
The Information and Support Hub operates during business hours and can be contacted in the following ways:

- online form
- email (supporthub@aemo.com.au), or
- phone 1300 236 600 (within Australia only).

Support to participants will be provided on:

- Market operations
- Trading outcomes
- Prudential issues
- Settlement outcomes

Weekends
Support on the weekend will be restricted to handling requests on:

- Participant access to the systems (account resets, network connectivity etc)
- Simple issues on interfaces and availability of reports/data
• Addressing trading system issues and notifying participants if the service is unavailable.

Very limited support will be provided for detailed questions on market operations. These types of questions will usually be followed up only within business hours.

**Market Suspension**

AEMO will suspend the market where there is a problem with the trading system.

**Triggers**

Trading system failure may range from minor short term outages with little or no consequence to significant outages at the extreme.

Triggers will be:

1. Participants unable to submit, amend or remove orders
   - A participant that cannot access the Trading System because they have an internet problem would not trigger market suspension.

2. Trading system is not functioning – trades cannot be matched and executed.
   - If outage time of the trading system is greater than **15 minutes** then AEMO will declare the outage a trigger event.

3. Financial trading limits cannot be calculated or applied to the validation of trading orders within the market operator systems.

**Process for market suspension**

To suspend operations AEMO will develop rules to specify the role and responsibility of AEMO and/or participants including any required communications, notifications and reporting. Normal processes such as settlement and delivery confirmation will continue during market suspension to the extent possible.

The proposed process will be as follows:

1. Events occur involving the trading system that can be categorised under one of the three triggers listed above for market suspension.
2. AEMO suspends trading system operation.
3. Issue a notice to participants of suspension; provide as much notification and information on expected duration as possible.
4. Suspension may be by product or by market – the process will be the same

**Process to re-open market**

AEMO will notify participants as soon as practicable of the expected duration and anticipated time of conclusion of the trigger event and when normal trading processes can be resumed. If suspension is to be extended beyond the expected duration time, then a notification of this delay will be provided.

In re-opening the market, AEMO is proposing to:

1. Issue a notice to participants on removing the suspension; providing as much notification as possible.
2. On resumption from a market suspension event AEMO will:
   - provide a 30 min pre-open (Traders can submit, amend or withdraw orders),
prior to resumption of trading clear any orders that have been crossed in accordance with pre-opening process, and

- resume continuous trading

Order status on return from suspension

This outcome will depend on system functionality, but feedback from potential participants has indicated a preference for:

- Expiring all open orders post market suspension, or
- All open orders are placed in suspension. The participants can then easily re-activate (their suspended) orders at their discretion.
Market conduct

The supply hub exchange rules will include requirements that will seek to protect the integrity of the market. In complying with these requirements participants will have a general obligation to observe high standards of market conduct and to act with due skill, care and diligence in using the trading system and performing transactions.

Market conduct rules include the requirement for trading participants to act in the following manner:

- honestly
- in a fair & orderly manner
- do not engage in manipulative behaviour
- to not submit trades with itself (wash trades)
- enter or accept an Order with the intention to default on its obligations

Specific conduct obligations will extend to the submission of orders, the exchange of information relating to trading, compliance and performance of transactions.

Monitoring

If AEMO has reasonable grounds to believe a trading participant has breached the market conduct rules and the breach is sufficiently serious to warrant action being taken, AEMO may impose specified sanctions provided for in the Exchange Rules and/or refer the conduct to the Australian Energy Regulator.

Triggering Participant Suspension

If a trading participant has potentially breached an obligation in relation to market conduct then AEMO will investigate the conduct and may, as a result of the investigation, apply the following process:

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEMO actions</td>
<td><strong>Suspend participant</strong></td>
</tr>
<tr>
<td>Issue notice to the participant that AEMO believes that they have breached a market conduct obligation</td>
<td></td>
</tr>
<tr>
<td>When</td>
<td></td>
</tr>
<tr>
<td>After AEMO has assessed the conduct</td>
<td>20 Business days after notice issued</td>
</tr>
<tr>
<td>Period the participant has to respond</td>
<td></td>
</tr>
<tr>
<td>5 Business days</td>
<td>N/A</td>
</tr>
<tr>
<td>Required Remedy</td>
<td></td>
</tr>
<tr>
<td>Evidence (acceptable to AEMO) that they have conducted themselves in accordance with the exchange rules</td>
<td>N/A</td>
</tr>
<tr>
<td>If Participant fails to remedy</td>
<td></td>
</tr>
<tr>
<td>Proceed to step 2</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Interaction with AER process
AEMO’s process for managing market conduct will be independent to the AER’s market monitoring process as the potential outcomes for the trading participant will be quite different. The following interaction between the two processes though will occur:

1. AEMO identifies a potential issue with a participant’s conduct;
2. AEMO discusses conduct with the trading participant and investigates. If AEMO is satisfied that no misconduct has occurred then AEMO pursues the issue no further. AEMO will not notify the AER;
3. If still concerned, AEMO will issue formal notice to the participant as per the step 1 on page 54 (of this report). AEMO will concurrently advise the AER of its preliminary inquiries into the participants’ specific conduct.

Enforcement of Conduct
For these purposes, it is proposed that the NGR will require gas supply hub participants to comply with the market conduct rules, so that a breach of those rules would be a breach of the NGR for which the AER could take action under the NGL. It is envisaged that this will be both a civil penalty and a conduct provision.

Participant Registration
To participate in the gas supply hub, an organisation must agree to be bound by the Exchange Rules by executing a Membership Agreement with AEMO. As a voluntary market, Part 15A of the NGR will not apply to registration for the gas supply hub.

It is proposed that there will be two classes of participant registration for the gas supply hub:

- **Viewing Participant**: Non-trading Participants will be able to access market information directly from the trading system, but orders and transactions will be anonymous.
- **Trading Participant**: Only Trading Participants will be able to submit orders for the purchase or sale of gas through the trading platform.

The registration processes and systems for the gas supply hub will leverage arrangements for existing electricity and gas markets operated by AEMO.

A prospective participant will need to provide AEMO with organisational and financial information as part of its application for registration, and will be required to pay the fixed annual participation fee upfront. A Trading Participant must post collateral with AEMO for it to be granted a financial trading limit on the exchange.

AEMO will not validate gas supply or transportation entitlements as part of the registration process. Each Product for Physical Gas will include a warranty that a party has all necessary transportation capacity rights to deliver or accept delivery of the relevant quantity of gas.

A registered participant must be a party to the relevant allocation agreements before they start trading those products on the exchange. As a consequence of the allocation agreement issue on the RBP it is likely that a participant will be required to designate the trading locations (products) that it intends to trade at as part of its registration. AEMO will notify (notification could be via a market report) registered participants of a new registration and the trading locations the participant intends to trade at. The notification will allow registered participants to perform any necessary system configuration to support trading with the new participant. Any changes to the trading locations traded by a participant after it is registered will also require communication to registered participants.

An outline of the potential requirements for the registration as a Participant at the gas supply hub is set out in the table below.
### Table 4: Requirements for Participant Registration

<table>
<thead>
<tr>
<th>Information Type</th>
<th>Information</th>
<th>Description of Information Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Company Details</td>
<td>Australian incorporated entity</td>
<td>The Participant will be an Australian incorporated entity and will provide their ABN to AEMO.</td>
</tr>
<tr>
<td></td>
<td>Trading and Settlement Representatives</td>
<td>The applicant will provide contact details for their trading and settlement representatives. The <strong>trading representative</strong> will receive a confirmation following the execution of a trade at the hub. The Trading representative will also receive any trading or delivery notifications relevant to specific products. For example, it is envisaged that the seller will notify the buyer (via the trading system) of the contract delivery point where the trading location is comprised of multiple delivery points. The <strong>settlement representative</strong> will be responsible for the submission and confirmation of delivered quantity data that will facilitate the settlement of a delivery default event. The settlement representative’s contact details will be made available to other participants to allow parties to arrange an alternative delivery of gas or to resolve a disagreement over the quantity of gas delivered at the hub.</td>
</tr>
<tr>
<td>Financial</td>
<td>Billing</td>
<td>Payments between AEMO and Participants will made using Austraclear. Participants will, if they haven’t already, establish an Austraclear account and will provide their Austraclear account details to AEMO as part of their application. AEMO will issue all invoices for the billing of hub transactions and as such trading entities will need to enter into a Recipient Created Tax Invoice agreement with AEMO.</td>
</tr>
<tr>
<td>Collateral</td>
<td></td>
<td>A Trading Participant must post collateral with AEMO prior to commencing trading participation at the hub. AEMO has a single financial guarantee pro forma for use in existing gas and electricity markets and all guarantees must be in the prescribed format.</td>
</tr>
<tr>
<td>Participant Application</td>
<td>Membership Agreement</td>
<td>To trade on the gas supply hub each trading entity must agree to be bound by the Exchange Rules. Trading entity and AEMO will enter into agreement.</td>
</tr>
</tbody>
</table>

Once an organisation is registered as a Trading Participant it will be granted trading access to the gas supply hub. The exchange platform will be web based and accessed via a secure connection as for AEMO’s existing gas and electricity markets. Trading Participants will also need to set up a user account to access the exchange platform.
Participant Suspension

Participants will have an obligation to act in accordance with the Exchange Rules. As set out under the relevant sections a breach of the financial, delivery or conduct obligations can trigger the suspension of a Participant. This section details the process for suspension of a participant.

Suspension process

On deciding to suspend a participant a number processes will be followed including:

- Market notification
- Obligations associated with trades executed but not yet due for delivery.

Different outcomes will flow from the specific trigger events.

Financial trigger

*Market notification*

AEMO will issue a notice to all participants following the suspension of a participant. The notice will detail:

- Participant affected
- That the suspension was a result of a financial trigger

Future delivery obligation (day-ahead product)

At the time a participant is suspended it may have trades for future gas days that are not yet due for delivery. As such the circumstances leading to suspension of a participant may result in the participant being unable to meet their obligations.

On suspension of a participant for financial reasons AEMO will:

- Deem all open transactions at the date of suspension “not delivered”.
- Non delivery will be subject to the established penalty framework and as such a counterparty to a trade with the suspended participant will receive a penalty payment.

The counterparty of the participant will need to re-establish a transaction in the market, if they wish to retain their previous physical position (to minimise the damages of non-delivery).

*Future delivery obligation (Forward product)*

The issues associated with closing out trades that a participant has entered into for future gas days are particularly relevant to future dated trading products.

Closeout of these transactions may add complication and therefore require further consideration from the GSHRG prior to implementation of the product.

Delivery and market conduct triggers

*Market notification*

AEMO will not issue a notice to participants following the suspension of a participant for conduct reasons.
Future delivery obligation (day-ahead product)

For a delivery or market conduct trigger it is AEMO’s intention to keep any existing trades that it has entered into for future gas days that are not yet due for delivery active. Hence the suspended participant will be required to honour any existing delivery obligations.

Effect of suspension

When issued with a suspension AEMO will change a participant’s status within the trading system so that they are suspended from trading. This will mean:

- New orders will not be accepted from the suspended participant.
- Orders submitted prior to the suspension will be made inactive.

Suspension period

Participants will incur a suspension from the market for a period of 1 month. The duration of the 2nd suspension would be for a period of 1 month as well, as per the table below.

<table>
<thead>
<tr>
<th>Type of breach</th>
<th>1st Suspension</th>
<th>Additional Suspensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial</td>
<td>1 month</td>
<td>As per 1st suspension or consider membership termination</td>
</tr>
<tr>
<td>Delivery</td>
<td>1 month</td>
<td>As per 1st suspension or consider membership termination</td>
</tr>
<tr>
<td>Market Conduct</td>
<td>1 month</td>
<td>As per 1st suspension or consider membership termination</td>
</tr>
</tbody>
</table>
Appendix 3: End-to-End Example

Participants
Trading activities of four registered participants are presented in this example to demonstrate the end-to-end trading, delivery and settlement processes associated with the gas supply hub.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producer</td>
<td>Gas producer deliver gas to Wallumbilla under existing GSAs. Nominations under existing GSAs vary from day to day. The producer has spare production capacity that it offers into the market.</td>
</tr>
<tr>
<td>End User</td>
<td>Long term GSA and GTA meet gas requirements of 20TJ per day. Has the ability to bank gas under existing GSA at a cost.</td>
</tr>
<tr>
<td>Energy Retailer</td>
<td>Long term GSA and GTA meet component of gas portfolio requirements. Bilateral and exchange trades used to meet varying portfolio requirements caused by seasonal variations in demand and churn of customers.</td>
</tr>
<tr>
<td>GPG</td>
<td>Combined Cycle Gas Turbine (CCGT) located downstream of the hub. Long term GSA and GTA meet large portion of gas requirements. The GPG is a buyer or seller of gas depending on electricity price and contract position.</td>
</tr>
</tbody>
</table>

Each registered participant maintains a bank guarantee with AEMO and for the purpose of this example it is assumed that the guarantee is sufficient to meet the settlement exposure that would be generated if the orders were to be transacted.

Trading Profiles
The gas requirements of each participant for delivery gas day 16 April 2014 are as follows:

- Producer
  - 10,000 GJ spare production capacity.
  - Initial sell orders of 5,000 priced at $5 and $7.
- End User
  - Unplanned outage at the plant reduces capacity by 50% for the next week. 10,000 GJ available for sale.
  - Must sell above $4, initial sell orders of 5,000 GJ priced at $6 and $7.
- GPG
  - Based on the forecast electricity price, the GPG is a buyer of 5,000 GJ parcels of gas at prices of $3.75 and $4.00 and a seller of 5,000 GJ parcels of gas at prices of $6, $8 and $12.
  - The GPG increases their forecast of electricity prices part way through the trading day and amends its bids and offers accordingly.
- Retailer
  - Require additional gas for their portfolio. Initial buy orders of 5,000 GJ of gas priced at $4.00 and $4.50.
Central Order Book

The trading platform displays all active buy and sell orders for each trading product. The buy and sell orders for the start of trading on 15 April 2014 are set out in the table below.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retailer</td>
<td>5.00</td>
<td>4.50</td>
</tr>
<tr>
<td>GPG</td>
<td>5.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Retailer</td>
<td>5.00</td>
<td>4.00</td>
</tr>
<tr>
<td>GPG</td>
<td>5.00</td>
<td>3.75</td>
</tr>
</tbody>
</table>

**Initial set of orders cannot be matched**

Buy orders

<table>
<thead>
<tr>
<th>Participant</th>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retailer</td>
<td>5.00</td>
<td>4.50</td>
</tr>
<tr>
<td>GPG</td>
<td>5.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Retailer</td>
<td>5.00</td>
<td>4.00</td>
</tr>
<tr>
<td>GPG</td>
<td>5.00</td>
<td>3.75</td>
</tr>
</tbody>
</table>

Sell orders

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
<th>Participant</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.00</td>
<td>5,000</td>
<td>GPG</td>
</tr>
<tr>
<td>8.00</td>
<td>5,000</td>
<td>GPG</td>
</tr>
<tr>
<td>7.00</td>
<td>5,000</td>
<td>Producer</td>
</tr>
<tr>
<td>7.00</td>
<td>5,000</td>
<td>End User</td>
</tr>
<tr>
<td>6.00</td>
<td>5,000</td>
<td>GPG</td>
</tr>
<tr>
<td>6.00</td>
<td>5,000</td>
<td>End User</td>
</tr>
<tr>
<td>5.00</td>
<td>5,000</td>
<td>Producer</td>
</tr>
</tbody>
</table>

Trade execution

The first example of a hub transaction occurs, as shown in the figure below, occurs when the Retailer aggresses the offer submitted by the Producer. The trading platform matches the orders and a transaction for 5,000 GJ is executed at a price of $5.00.

Following the first hub transaction the End User and the GPG improve the price of their orders. The GPG increases its forecast of electricity prices and as a result increases the price of its buy and sell orders by $0.50. However, there is still $0.50 between the order prices of the End User and the GPG and as such the orders cannot be matched.
The second example of a hub transaction occurs when the End User aggresses the bid. A transaction for 5,000GJ is executed at a price of $4.50.

At the end of trading on 15 April 2014, two transactions have been executed for delivery gas day 16 April 2014.
Delivery

**Nominations**

Once a transaction has been completed the buyer and seller are issued with a notification confirming the details of the transaction. Based on the trade confirmation notice, the Participants will arrange for the delivery of the transactions.

**Schedule**

The pipeline operator schedules receipts and deliveries in accordance with the submitted nominations.

**Allocations and Actual delivery**

After the end of the gas day the participants are provided with allocation data by the relevant pipeline operators. Based on the allocation data the participants determine the delivered quantity for each transaction.

<table>
<thead>
<tr>
<th>Transaction Ref</th>
<th>Delivered Quantity (GJ)</th>
<th>Transaction Quantity (GJ)</th>
<th>Delivery Variance (GJ)</th>
<th>Percentage Variance</th>
<th>Tolerance</th>
<th>Delivery details</th>
</tr>
</thead>
<tbody>
<tr>
<td>31062</td>
<td>5,100</td>
<td>5,000</td>
<td>100</td>
<td>2</td>
<td>Within</td>
<td>Producer delivers 100GJ more than the transaction quantity to the delivery point.</td>
</tr>
<tr>
<td>31063</td>
<td>4,000</td>
<td>5,000</td>
<td>-1,000</td>
<td>20</td>
<td>Outside</td>
<td>End user on-sells unused gas to GPG. Not all gas is delivered to the receipt point.</td>
</tr>
</tbody>
</table>

**Settlement**

**Hub transactions**

All gas transacted on the exchange is settled at the price it was transacted on the exchange. The Physical Gas Payments and Charges associated with the scenario transactions are set out in the table below.

<table>
<thead>
<tr>
<th>Transaction Ref</th>
<th>Participant</th>
<th>Quantity (GJ)</th>
<th>Price ($/GJ)</th>
<th>Settlement Amount ($)</th>
<th>Payment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>31062</td>
<td>Retailer</td>
<td>5,000</td>
<td>5.00</td>
<td>25,000</td>
<td>Physical Gas Charge</td>
</tr>
<tr>
<td>31062</td>
<td>Producer</td>
<td>5,000</td>
<td>5.00</td>
<td>25,000</td>
<td>Physical Gas Payment</td>
</tr>
<tr>
<td>31063</td>
<td>GPG</td>
<td>5,000</td>
<td>4.50</td>
<td>22,500</td>
<td>Physical Gas Charge</td>
</tr>
<tr>
<td>31063</td>
<td>End User</td>
<td>5,000</td>
<td>4.50</td>
<td>22,500</td>
<td>Physical Gas Payment</td>
</tr>
</tbody>
</table>
**Delivery Variance**

A delivery variation within tolerance is settled at the transaction price. A delivery variation outside of the tolerance is settled at the transaction price plus 25% to compensate for the delivery failure.

<table>
<thead>
<tr>
<th>Transaction Ref</th>
<th>Participant</th>
<th>Delivery Variance Quantity (GJ)</th>
<th>Price ($/GJ)</th>
<th>Settlement Amount ($)</th>
<th>Payment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>31062</td>
<td>Retailer</td>
<td>100</td>
<td>5.00</td>
<td>500</td>
<td>Delivery Variance Charge</td>
</tr>
<tr>
<td>31062</td>
<td>Producer</td>
<td>100</td>
<td>5.00</td>
<td>500</td>
<td>Delivery Variance Payment</td>
</tr>
<tr>
<td>31063</td>
<td>GPG</td>
<td>-1,000</td>
<td>(4.50 + 1.125) = 5.625</td>
<td>5,625</td>
<td>Delivery Variance Payment</td>
</tr>
<tr>
<td>31063</td>
<td>End User</td>
<td>-1,000</td>
<td>(4.50 + 1.125) = 5.625</td>
<td>5,625</td>
<td>Delivery Variance Charge</td>
</tr>
</tbody>
</table>

**Transaction Fees**

For the purpose of this example the transaction fees are based on a price of 0.05 ($ / GJ)

<table>
<thead>
<tr>
<th>Transaction Ref</th>
<th>Participant</th>
<th>Transaction Quantity (GJ)</th>
<th>Settlement Amount ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>31062</td>
<td>Retailer</td>
<td>5,000</td>
<td>250</td>
</tr>
<tr>
<td>31062</td>
<td>Producer</td>
<td>5,000</td>
<td>250</td>
</tr>
<tr>
<td>31063</td>
<td>GPG</td>
<td>5,000</td>
<td>250</td>
</tr>
<tr>
<td>31063</td>
<td>End User</td>
<td>5,000</td>
<td>250</td>
</tr>
</tbody>
</table>

**Total Settlement Amount**

The total settlement amount associated with the scenario transactions is set out in the table below.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Physical Gas ($)</th>
<th>Delivery Variance ($)</th>
<th>Fees ($)</th>
<th>Total Settlement Amount ($)</th>
<th>Delivered Quantity (GJ)</th>
<th>Average Price ($/GJ)</th>
<th>Payment Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retailer</td>
<td>25,000</td>
<td>plus 500</td>
<td>250</td>
<td>26,750</td>
<td>5,100</td>
<td>5.05</td>
<td>Charge</td>
</tr>
<tr>
<td>Producer</td>
<td>25,000</td>
<td>plus 500</td>
<td>250</td>
<td>25,250</td>
<td>5,100</td>
<td>4.95</td>
<td>Payment</td>
</tr>
<tr>
<td>GPG</td>
<td>22,500</td>
<td>less 5,625</td>
<td>250</td>
<td>17,125</td>
<td>4,000</td>
<td>4.28</td>
<td>Charge</td>
</tr>
<tr>
<td>End User</td>
<td>22,500</td>
<td>less 5,625</td>
<td>250</td>
<td>16,625</td>
<td>4,000</td>
<td>4.16</td>
<td>Payment</td>
</tr>
</tbody>
</table>
Appendix 4: Capacity Trading

The establishment of the trading framework and systems for the proposed Gas Supply Hub could be leveraged to support voluntary secondary trading of transportation capacity.

A facility for capacity trading within the gas supply hub framework would allow participants to transport gas purchased on the exchange and once established could also allow participants to list spare capacity in other natural gas services including storage, compression and other hub services.

Secondary Capacity Trading

The NGR allows shippers to trade their transportation capacity in two forms:

- **Novation**: Shipper assigns their capacity to a third party. The assignee must enter into a new Gas Transportation Agreement (GTA) with the pipeline operator for the assigned capacity. The assignment is subject to the approval of the pipeline operator.

- **Bare Transfer (Shipper to Shipper)**: Shipper subcontracts a portion of their transportation service to a third party. Shipper maintains contract with the pipeline operator, all nominations and allocations of the third party are made via the contracting shipper. The contract holding shipper must inform the pipeline operator of a bare transfer giving them notification of the duration and quantity of the services transferred and the identity of the third party shipper.

The development of capacity trading within the gas supply hub framework will be based on the Bare Transfer of capacity between shippers.

Recommended Approach for the Gas Supply Hub

AEMO proposes to work with the GSHRG over the next 12 months to develop a framework that supports the voluntary secondary trading of capacity by leveraging the proposed trading arrangements and the standardisation of terms. It is proposed that the trading of capacity be facilitated through a bulletin board approach, enabling participants to advertise a willingness to trade a specific transportation service.

Traders can identify potential counterparties and then commence bilateral negotiation of quantity, price and terms of a capacity trade. The execution of a trade, settlement and credit risk management arrangements would be managed outside of the market by the Participants.

The more terms and conditions that can be standardised the easier it will be for Participants to trade their spare capacity. A legal working group will be formed to develop standard terms and conditions for the secondary trading of capacity. A number of participants have given support to the development of standard terms and conditions for capacity trading and are willing to be involved in a legal working group to develop transport capacity products.

The key terms and conditions that will need to be developed by the legal working group include:

- **Nomination process and information exchange**: A Bare Transfer requires the parties to a capacity transaction to exchange information relating to nominations, schedules and allocations.

- **Obligations on the buyer in relation to their use of the transportation service**.

- **Additional Charges incurred by Contract Holding Shipper**: The contract holding shipper would also require the ability to recover any additional charges levied by the Pipeline Operator due to an imbalance caused by the third party shipper.

The development of standards by industry for the secondary trading of capacity could in the future allow transportation and hub services to be listed as trading products on the exchange. To
development the necessary trading liquidity it will be import to select a set of receipt and delivery points that can be accessed by many potential buyers and sellers.

The development of exchange traded capacity products would simplify the trading process for participants as potential buyers and sellers need only agree to the price and quantity of a product to complete a transaction.

The centralised settlement, billing and credit risk management services developed for the gas supply hub could also be utilised for the exchange trading of the capacity products. The development of exchange traded capacity products would allow the bundling of transportation and physical gas products which could provide better portfolio solutions for participants.
Appendix 5: Market systems overview

Gas Supply Hub Market Systems Overview

The high level functional components are described in detail in the following sections and will form the basis of the detailed specifications and requirements definition for the market systems. The requirements are also listed in a table.

Participant Registration

The Gas Supply Hub market system will support the registration of participants and enable the use of participant registration information for authentication, reporting and notification purposes. This functionality is expected to be similar to that provided by the existing AEMO operated gas market systems. This makes particular sense when dealing with participants who are active across multiple markets where having a common registry would minimise redundant data entry and provide a “single source of truth” for registration data.

The registration system will capture all necessary participant details including trading name, ABN and contact details for all of the types of notification and alerts issued by the system such as market notices, submission confirmation, trade execution confirmation, prudential notices, settlement notices and statements. The registration system will support the identification of a participant as active or suspended in the market.

The registration system will also support the use of multiple system user accounts per trading participant to access the trading system.

Note: The maintenance of participant user accounts (username, password, linked company, contact details etc.) on the supply hub Trading Platform will be handled manually in the first instance. The proposed systems solution will not provide an automated link between registration information and the trading platform user accounts. Sufficient consideration must be given to correctly account for any material additional operational effort required to handle this task on an ongoing basis.

Trading Platform

Market participants will be able to securely login to the AEMO Supply Hub trading system using a user name and password that is linked to a registered participant company ID.

At a high level, the following use case scenarios are envisaged as available to the user of a participant organisation-

Basic Scenario
- Select a product (this will determine the gas day and node or receipt point at the hub that a bid or offer submission relates to); the system will provide search filters (by date, product etc.).
- View last traded quantities and prices for the selected product
- View currently open bids and offers for the selected product
- Select to submit a bid or offer to buy or sell gas under the selected product
- Nominate the quantity of gas and price – which for a seller will be the minimum price they demand for the sale and for a buyer would be the maximum price they are willing to pay for a purchase, per unit of gas.
- The use of price limited bids and offers may also be considered whereby the offer or bid is only available for trade if the settlement price falls within a predefined range.
- The use of hidden bids and offers may also be considered whereby the bid or offered quantity of gas is put up for trade in tranches where all the tranches add up to the original quantity but the full quantity is not shown as a single number on the trading platform or public reports.
- Submit the nomination and receive confirmation (via SMS/email/reports etc.) on whether the trade has been executed. The traded price will be calculated as per the exchange rules as applicable for the traded quantity (full/partial). The matched bid and offer at any point will be those for a given node and gas day where the bid price is greater than the offer price and the difference between the two is greater than all other possible matches. Where the prices are the same for a bid or offer, the earlier submission is used.
The end of the trading day may be required to be staggered from day to day (within the range of a few seconds/minutes) so as to reduce the risk of gaming caused by last offers or bids entered with the purpose of setting the closing price.

**Extended Scenario**

- Access the Trading Platform to search for previously executed trades where their organisation is a counterparty (up to 9 months after the trade).
- Select to enter or update a receipt quantity (null by default) for the trade.
- Confirm and submit the updated receipt quantity.
- The system will notify the other party to that trade that a receipt quantity has been updated for the trade (providing the execution ID, product, quantity and price details).
- The system will allow that counterparty user to review the entered receipt quantity and if the party deems it valid, confirm the acceptance of that quantity.
- The system will notify both counterparties that the receipt quantity has been updated and confirmed.
- The system will allow further updates to the receipt quantity but only the last confirmed quantity will be used for settlements. An audit log will be maintained showing the sequence of updates.

The extended functionality noted above is required to allow the system to capture instances where the delivered gas quantity is different to that traded. With the confirmation of both parties to that trade, the system will accept a receipt quantity whereby the difference between the receipt quantity and the traded quantity will be cashed out during settlement. If the quantity is lower than the traded quantity, the system will cash out the difference by paying the buyer and charging the seller. If the quantity is greater than is traded, the system will cash out the difference by charging the buyer and paying the seller for the difference. Above a defined threshold, the system will be able to add a penalty amount (fixed or variable) to the cashing out process to incentivise correct delivery of traded gas.

A screen mock-up of the trading platform is shown below. The WD, DA and WE products shown in the screenshot refer to gas delivered “Within Day”, “Day Ahead” and “Weekend”. These are shown here for reference only and the actual product definition for the proposed hub is covered elsewhere.

![Figure 17 - Sample Screen Layout](image-url)

Market participants will also be able to manually or automatically obtain standard reports relating to their trades (bids, offers, executed trade quantities and prices) and settlement position (statements) via secure FTP transfers (or similar electronic means of delivery).
Settlement

The Supply Hub market system will support the settlement of executed trades. The settlement system will be provided with trading information (specifically, quantity and price of executed trades per participant for the settlement period) by the trading platform on a daily basis (trade by trade for each participant).

AEMO settlements teams will be able to set the settlement period for the hub, calculate the settlement amounts for the period, add any additional amounts and market fees to the settlement totals and issue statements. The system will support Preliminary, Final and Revision settlement runs. The settlement system will securely generate and issue (email/FTP) electronic settlement statements (in formats such as PDFs). The system will also be able to generate financial reports and data files required to interface with the AEMO payment clearing system.

Additionally, it is expected that the settlements processing will be complemented by daily prudential management processes which will require the system to capture security amount (collateral or guarantee) details for each participant and be able to monitor each participant’s exposure (actual and expected) in the market against the trading and/or margin call limits associated with the security amount. The system will support the issuing of trading limit notices and margin calls based on a defined exposure thresholds.

The settlement system will provide daily prudential information (total exposure) for each active participant to the trading platform prior to the start of a trading day. The trading platform will build on this on a trade by trade basis and apply credit management validations to minimise the risk of contractual default by either counterparty.

Prudential Management

The market systems will support one of two approaches for the prudential and credit risk management of trades (risk of non-payment or non-delivery). In a trading process based on bilateral contracts, credit management will involve constant assessment of each participant’s net market liabilities based on their most recent market/trading position and their respective market collateral derived trading limits:

Daily Processing

A fairly simple (if manual) process currently applied by AEMO in other gas markets is one where the net position (exposure) of a participant is assessed on a daily basis and where the participant has incurred liabilities, the total amount is compared with a percentage (70% for trading limit and 80% for margin call) of their security amount. Where these thresholds have been breached on any given day, the participant is required to unwind their position or increase the security amount to provide greater cover. Where they fail to do so, the participant is restricted from trade or under extreme circumstances, suspended in the market. This method requires the security amount to be locked in for a period of time (so as to avoid instances where participants pass a prudential check only to draw down the security amount after the trade).

Continuous Processing

A variation of the above method is one where the trading platform maintains up-to-trade assessments of participant net liabilities, trading and warning limits. Prior to the acceptance of submissions of bids and offers, the system will ensure that the resulting net exposure for either participant does not exceed the set limits. As with the previous method, this option requires locked-in security amounts that cannot be reduced at any time to be less than the net liabilities at that time for that participant. This is the preferred choice for the systems design.

External Reporting

The solution will generate and issue data feeds and/or reports to market participants as well as the public. This functionality will follow the same approach as that adopted for the other markets operated by AEMO. The solution must meet the following reporting requirements –

Support issuing of event or time triggered reports/data feeds by participant.
Support issuing of event or time triggered reports/data feeds to the AEMO public webpage.

An initial set of 10 types of external reports is envisaged, 6 private reports and 4 public reports-
Private:
- Bid/Offer Confirmation Report
- Trade Execution Report
- Prudential Exposure Report
- Settlement Report
- Registration Report
- Contact Details Report

Public:
- Registered Participants Report
- Price Index Report
- Traded Quantities Report
- Product Summary Report

Additionally, the system must be able to generate the following statements and notices by participant:
- Settlement statements (Preliminary, Final and Revision)
- Trading Limit Notice
- Margin Call Notice

Additionally, 4 aggregated market data feeds/reports to market regulators may also be provided. All reports and data feeds will be secure as per AEMO security policies and guidelines. Note that the use of Prudential Dashboard and Settlement Direct by the supply hub participants will be considered for this market subject to an assessment of the value provided in doing so.

Other Functionality
In keeping with the relatively simple design of the brokerage model based market, the solution for the GSH does not include participant data interfaces other than that provided by the trading platform and reporting system as detailed above however the ability to provide market information through an electronic gateway (such as that available for the STTM) will be considered for this market subject to an assessment of the value provided in doing so.

Conceptual Design
The conceptual diagram on the following page graphically shows the various functional blocks for the market systems and maps the various data flows between them.
Figure 18 - High Level Functional Architecture
Non Functional Requirements

In addition to the functional requirements, the following non functional requirements have also been covered by the Gas Supply Hub specifications and design. The details of these requirements have been based on the nature of the market operational times (9AM to 5PM AEST, 7 days a week), participant access options (Internet), expected data loads (high watermark over the first 5 years for concurrent transactions, submissions for a day) and appropriate redundancy needs (non-redundant, back up based) and future augmentation (new products and data items). This is in line with AEMO’s approach for the other market systems it operates.

- **Accessibility and Standards** - covers the user interface design and useability
- **Systems Architecture** – covers the technical architecture and its strategic fit for AEMO and Market Participants
- **Systems Security** – covers the level of security and associated standards applied to the market systems
- **Data Management** – covers how market data is stored and handled, this includes data confidentiality, privacy, retention and migration
- **Systems Performance and Availability** – covers the responsiveness and robustness of the market systems
- **Disaster Recovery** – covers the fail over requirements and maximum acceptable outage times and data loss
- **Extensibility** – covers the scalability of the systems to handle future additions or changes to the market design and requirements
- **Application Architecture** – covers the suitability of the application platform chosen for the market systems
- **Database Architecture** – covers the suitability of the database platform chosen for the market systems
- **Network Architecture** – covers the suitability of the network architecture chosen for the market systems

The following table lists the business requirements which will apply to the GSH IT systems as derived from the Gas Supply Hub market design. These high level requirements have been prioritised according to the emphasis in the design and operational preferences (for AEMO and Market Participants):

<table>
<thead>
<tr>
<th>Scope</th>
<th>Priority</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Scope</td>
<td>High</td>
<td><strong>Trading Platform Specific</strong>&lt;br&gt;• The system will support the setup of account administrators whereby nominated traders can control the access and trading limits for their own accounts&lt;br&gt;• The system will automatically (without operator intervention) accept and match bids and offers submitted by market participants by price, quantity and product (the product will define the trading node and gas day)&lt;br&gt;• The system will only display unfulfilled offers and bids on the trading screen&lt;br&gt;• The system will automatically execute matched trades, and allow the quantities to be spread over multiple trades as required&lt;br&gt;• The trades will be matched by best available price followed by time order, with the more recent submission considered first&lt;br&gt;• The system will support continuous trading whereby trades are matched and executed continuously through the trading day&lt;br&gt;• The system will inform participants (who are a counterparty to the trade) of executed trades detailing the execution identifier, product, quantity, price as well as counterparty identifier and contact details for the trade&lt;br&gt;• The system will allow participants to withdraw their bids and offers if the bids and offers have not been traded&lt;br&gt;• The system will support Day Ahead and Within Day Trades (these determine the delivery time frame for the gas).&lt;br&gt;• The system will generate time and event triggered data feeds and/or reports and provide them to participants via the web or other electronic means&lt;br&gt;• The system will support a minimum parcel size to be defined for the market or by product&lt;br&gt;• The system will support time-boxed products such that they can only be traded between defined periods (hh:mm) during the trading day</td>
</tr>
</tbody>
</table>
The system will support primary validations such as checking that submitted prices are within the acceptable range of minimum and maximum prices and quantities are not negative.

The system will support expiry of bid offer submissions (at or prior to the end of the trading day as defined by the submitter and/or market operator) – note that the current design calls for all open (untraded) bids and offers to be removed (expired) after the trading day is completed.

The system will support credit checking of counterparties prior to each trade execution.

The system will generate alerts whereby participants will be alerted to offers or bids on the screen that have been submitted by suspended participants (and hence will not be matched for trade execution by the system).

The system will notify a participant where they have been prevented from trading due to a breach of trading limits.

The system will support market suspension whereby all trading and submissions of offers and bids in the market is stopped, for all or selected products.

The system will support the automated scheduling of different trading periods so that for example, the system will be in a pre-trading period for a part of the day (allowing submissions and withdrawals but without active matching and execution of trades).

The Trading system will provide trading data (Trade ID, product, counterparty IDs, traded quantity, price, confirmed receipted quantity) relating to each executed trade to the settlement system for daily settlement and prudential processing.

Settlement and Prudential Management Specific

The system will calculate settlement amounts for participants (e.g. Total amount payable is the aggregate of all traded amounts where the participant has supplied the gas, Total amount chargeable is the aggregate of all the traded amounts where the participant has receipted the gas).

The system will accept, validate and use agreed (between the counterparties) receipted quantities for a trade so as to allow settlements to use adjusted trade amounts.

The system will support the capture of collateral or security amount details (Participant, Amount, Period, Collateral Type) to set the trading limit for participants.

The system will allow the application of collateral amounts towards a participant's outstanding amounts if required.

The system will handle the application of a defined GST rate to settlement items by market and product.

The system will allow the application of any shortfalls in the market settlements for a trading period to all participants, pro-rated to the amounts owed by the participants in that statement.

The system will support monthly settlement periods.

Common

The system will allow Participants to submit bids and offers for gas via a networked (web based) application.

The system will follow existing AEMO processes for participant registration, participant settlement, prudential management, market notifications and publications.

The system will generate time and event triggered notifications (SMS/Email) which will be directed to registered participant contacts.

The system will allow trading participants to directly access relevant data that is currently published on the MIBB (via a link or a data feed) from the GSH trading screens.

The system will support the ability for participants to submit available pipeline capacity such that it is visible to other participants who may wish to approach the listing participant to procure unused capacity to ship gas traded at the hub. The listing will provide contact details of the participant holding the capacity.

The system will support the use of a fixed price period during which all trades are executed at a calculated (formula to be defined) price (e.g. weighted average price for the product for the preceding x trading hours or days).

The system will support the submission of linked bids and offers such that the...
execution of a trade including one submission (by a participant) removes another submission from trading (one cancels the other)

- The system will support trading by spread across products. This will allow traders to track and trade on the spreads between products such that a simultaneous buy and sell order across two products will be triggered by the trader based on the spread between the two at any time during the trading day.
- The market systems for the Gas Supply Hub will provide a non-interactive (automated transaction based) method for submission of data (for example allowing submission of bids, offers, receipt quantities and confirmations as XML or CSV files). This method will provide handshaking logic whereby acknowledgements are passed back to the submitter to confirm receipt and validation of the submitted data.

<table>
<thead>
<tr>
<th>Out of Scope (possible future enhancements)</th>
<th>Low Priority</th>
<th>Common</th>
</tr>
</thead>
</table>
|                                            |              | - The system will support trading of future dated gas deliveries
|                                            |              | - The system will support trading products that are in turn based on other trading products (e.g. quarterly products based on monthly products)
|                                            |              | - The system will support the generation, maintenance or downloading of contract documents for executed trades
|                                            |              | - The system will maintain contract priority information
|                                            |              | - The system will apply secondary business validations to bids and offers, e.g. credit checks when accepting bids and offers (prudential management may also be operationally applied as part of daily settlement processing)
|                                            |              | - The system will be accessible via AEMO’s secure market net framework or similar (secure channels through the internet may be an option)

<table>
<thead>
<tr>
<th>Not In Scope</th>
<th>Excluded</th>
<th>Common</th>
</tr>
</thead>
</table>
|              |          | - The system will not support interfaces from facility operators
|              |          | - The system will not support a gas scheduling process
|              |          | - The system will not support an optimising constraint equation (LP) with tie breaking logic and single price for the day
|              |          | - The system will not support capacity or flow constraint prices, payments or charges
|              |          | - The system will not maintain or report on facility capacity information
|              |          | - The system will not interface with or support dependencies on or from the STTM hub systems
Appendix 6: Legal and regulatory framework

AEMO considers that the NGL and NGR amendments would address the matters set out below.

National Gas Law

- Expand the list of AEMO’s statutory functions in section 91A to include additional ‘gas trading hub’ functions (by reference to a new section in Chapter 2, Part 6 of the NGL):
  - to operate, or to appoint another person to operate, a facility through which persons may trade in natural gas or related products and services, subject to the NGR; and
  - where AEMO operates such a facility, to make rules for participation in, and the operation of, that facility.
- Include a new provision in Chapter 9, Part 2 authorising the South Australian Minister to make initial Rules related to AEMO’s ‘gas trading hub’ functions.
- Include authority in Schedule 1 (e.g. in clause 55C) for the NGR to make provision for AEMO’s ‘gas trading hub’ functions.

National Gas Rules:

- Define a ‘gas trading hub’ (or other appropriate term) as a facility through which persons may trade in natural gas or related products and services.
- Include related definitions as required, including ‘gas trading hub rules’ and a ‘gas trading hub member’ (a person other than AEMO who is, or was at any relevant time, a participant in a gas trading hub in accordance with the gas trading hub rules).
- Authorise AEMO to appoint a person to operate a gas trading hub if AEMO is satisfied that person has the appropriate qualifications and experience to do so.
- AEMO or an operator appointed by AEMO may make gas trading hub rules about any relevant matter relevant to the operation of a gas trading hub or the participation of a person, including:
  - the process for becoming a participant in the exchange;
  - categories and conditions of participation or trading;
  - products that may be traded;
  - payment and delivery;
  - collateral requirements;
  - market fees; and
  - dispute resolution.
- The gas trading hub rules must specify provisions for the amendment of those rules.
- A gas trading hub participant must comply with a provision identified as a market conduct rule in the gas trading hub rules (that is, breach of a market conduct rule will be a breach of the NGR).

National Gas Regulations

- Amend schedules 3 and 4 to include the rule requiring compliance with the market conduct rules as both a civil penalty and a conduct provision.

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2 Section 91A(1)(a) alone is unlikely to be sufficient to bring the operation of the exchange within AEMO’s statutory functions because it refers to markets operated and administered ‘in accordance with the Law, the Rules and the Procedures’. A specific provision for this market is therefore required. Note that this will not be a ‘regulated gas market’ for the purposes of the NGL.

3 It is noted that AEMO’s ability to determine and recover fees and charges for the performance of its statutory functions (which will include the operation of the hub) is regulated by section 91E of the NGL.
Appendix 7: Exchange Rules

Outline 1: Exchange Rules

<table>
<thead>
<tr>
<th>1</th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Scope</td>
<td>The rules form part of a multilateral contract between the Operator and each Participant, made binding through Membership Agreements. The contract will also incorporate any ancillary documents such as terms of use for the Trading System. This single set of rules will govern all Products.</td>
</tr>
<tr>
<td>1.2 Definitions and interpretation</td>
<td>Definitions and interpretation rules will be incorporated. In this outline:</td>
</tr>
</tbody>
</table>

- **Operator** refers to AEMO or a person appointed by AEMO to operate the exchange.
- **Order** refers to Bids and/or Offers. Bids are offers to buy (i.e. enter into a Transaction as a buyer), Offers are offers to sell (i.e. enter into a Transaction as a seller).
- **Participant** refers to any party other than the Operator. Initially there will be two categories of Participant, being those with rights to trade (Trading Participants) and those with rights only to view certain information on the Trading System (Non-trading Participants).
- **Product** refers to the products offered on the Trading System, which may be further classified for the purposes of the Rules, such as “Physical Gas” covering both “Physical Gas Day Ahead” and “Physical Gas Within Day” which would include contracts for gas delivery during the specified delivery period at a specified point (or set of points) on a pipeline. Initially all Products will be Physical Gas (not hub services or transportation capacity).
- **Trading System** refers to the electronic, web based platform through which Bids and Offers will be posted and Transactions formed, to be established and administered by the Operator, and the systems that support the operation of that platform for the purposes of the rules.
- **Transaction** refers to the transactions formed through the Trading System.

1.3 Amendment of rules | The Operator will be able to amend the rules from time to time by notice, after consulting with Participants about proposed amendments using consultation procedures in the rules. These procedures will provide for:

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*4 Allows for the possibility that another entity may be appointed to operate the market as traded products and services evolve.*
Exchange Rules Outline

- a right of the Operator or any Participant to propose changes;
- an initial assessment process allowing the Operator not to proceed with a change proposal in certain circumstances (similar to rule 135ED(4) of the National Gas Rules in relation to Procedures);
- the Operator to issue consultation documents to Participants including an impact and implementation report (not required for minor changes) and a draft of the rule change;
- a minimum consultation period of 20 business days unless the Operator considers the matter is urgent or a minor change;
- further consultation to be undertaken if the Operator considers it desirable; and
- minor and urgent changes may be made subject to an expedited consultation procedure, where there is no objection from Trading Participants.

Amendments will generally apply to Transactions entered into after the amendment takes effect.

2 Participation

2.1 Participation criteria

The participation criteria will cover legal capacity (being an Australian incorporated entity). The Operator may specify criteria relating to financial and technical capacity for particular Products (see point 3.3 below, ‘Admission to trading’), but none are envisaged for the proposed initial Products.

Each Transaction for Physical Gas will include a warranty that a party has all necessary transportation capacity rights to deliver or accept delivery of the relevant quantity of gas, but the Operator will not verify those rights as a condition of participation.

2.2 Becoming a Participant

To become a Participant, a person must execute and deliver to the Operator the application form, the executed Membership Agreement and associated documentation, pay the application fee and (if the Participant is a Trading Participant) post any minimum amount of collateral.

- The form of Membership Agreement will be in the rules and provide for the incoming Participant to agree to be bound by and comply with the rules.
- The application form will provide information about the applicant, how it meets the participation criteria, nomination and contact details of relevant Representatives, Austraclear details (for Trading Participants).
Exchange Rules Outline

Participants) and system requirements (refer to point 4.3 below, ‘Access’).

The Operator will accept the applicant as a Participant and execute the Membership Agreement on behalf of itself and all Participants if the participation criteria are met. The Membership Agreement will result in the new Participant being party to the multilateral agreement to which the Operator and each other Participant is also a party.

2.3 Change in circumstances

Each Participant will be required to notify the Operator immediately if it ceases to satisfy the participation criteria and to provide information to the Operator on request to verify its ongoing satisfaction of the criteria.

2.4 Termination

A Participant may terminate its participation by giving at least 30 days’ prior written notice to the Operator and executing any termination documents specified by the Operator.

The Operator may, on its own behalf and on behalf of all other Participants at the time, terminate by notice the participation of a Participant the subject of an insolvency event or who ceases to satisfy the participation criteria.

Other termination events may be included if considered appropriate (e.g. serious or repeat breach of market conduct obligations or breach of confidentiality).

Termination of a Participant will be without prejudice to any rights which may have accrued prior to the termination and rights and obligations expressed to continue after termination.

2.5 Participant representatives

Each Participant must nominate a person within its organisation authorised to fulfil one or more of the following roles on behalf of the Participant:

- Systems Representative (all Participants), for matters relating to establishing and maintaining secure access to the Trading System in accordance with the access and interface rules (refer 4 below), and to receive non-trade related system notices.

- Trading Representative (Trading Participants only), to submit orders, to receive confirmation of Transactions and to submit and receive notices from Transaction counterparties in accordance with the terms of the Product (eg notification of delivery point within a trading location).

- Settlement Representative (Trading Participants only), to submit and receive confirmations of delivered quantities to the Operator and to communicate with Transaction counterparties in relation to the settlement of under-delivery or receipt, including as the first point of contact in any dispute.

The Participant will be responsible for ensuring that anyone
Exchange Rules Outline

accessing the Trading System using the Participant’s interface is authorised by the Participant to do so and complies with the rules for access and use of the Trading System (Authorised Users).

The rules will provide for the form of notification and the obligations of Participants with respect to Participant Representatives and Authorised Users. The Trading System may allow Participants to give some Authorised Users “view only” rights and others “trading” rights.

2.6 Market conduct

The rules will include provisions intended to protect the integrity of the market. Participants will have a general obligation to observe high standards of integrity and fair dealing and high standards of market conduct and act with due skill, care and diligence in using the Trading System and performing Transactions.

The conduct rules will include the following specific obligations for Participants:

- to comply with all applicable laws relevant to the performance of its obligations under the rules or any Transaction (including obtaining and maintaining all authorisations required for that purpose);
- to ensure to the standard of a reasonable and prudent operator that all data and information it submits is correct;
- to ensure it is able to perform any obligations in respect of which it submits an Order;
- not to submit Orders with the intent to default, or to knowingly default in the performance of any Transaction;
- not to submit Orders with the intention of causing a Transaction to arise with itself or an affiliated Participant other than on commercial terms;
- not to attempt to distort, manipulate or abuse the market for any Product (including reported prices) in any other way; and
- to comply with the confidentiality requirements of the rules.

It is proposed that the National Gas Rules will include an obligation to comply with these general and specific market conduct requirements, which would be a civil penalty provision and a conduct provision. Breach of the market conduct rules will constitute a breach of the National Gas Rules.

If the Operator has reasonable grounds to believe a Participant has breached the market conduct rules and considers it sufficiently serious to warrant action, the rules
Exchange Rules Outline

will allow the Operator to proceed by way of specified sanctions including warnings, imposing new trading limits, suspension and referring the conduct to the Australian Energy Regulator.

2.7 Fees
Participants will be required to pay participation fees. These may include an entrance fee, an annual fee, transaction fees and ad-hoc fees, for example for providing training, assistance or advice in relation to access to and use of the Trading System.

3 Admission to trading

3.1 Categories of Trading Participant
Initially, there will be only one category of Trading Participant. Over time as the market develops, other categories of Trading Participant may be created.

3.2 Starting to trade
The right to trade will start when the Participant has provided all necessary information specified in the application form for a Trading Participant, has an Austraclear account, has executed a recipient created tax invoice agreement, has a working, secure, connection to the Trading System and has posted collateral.

3.3 Scope of right to trade Products
A Trading Participant must apply to the Operator to be admitted to trade any Product. While it is expected that all Trading Participants would automatically be permitted to trade all initial Products, this allows flexibility to specify any pre-conditions for trading additional Products if appropriate.

Once accepted for trading a Product, the Trading Participant will be entitled to submit, withdraw and accept Orders through the Trading System for the Products to which it has been admitted.

3.4 Collateral and financial trading limit
Each Trading Participant will be required to post and maintain collateral to secure payment of amounts owed by the Participant under the rules. The form of acceptable collateral will be an unconditional bank guarantee in a form acceptable to the Operator. Cash deposits may be accepted at the Operator’s discretion.

The Operator may determine a minimum amount of collateral for Trading Participants or a class of Trading Participants. It is expected that all Participants would pay an annual fee in advance in order to maintain their status, so no minimum amount will be required for the initial Participant categories.

The amount of collateral posted by a Trading Participant will set the financial trading limit of the Participant, such that at any time, the amount of the collateral must be more than an amount representing the likely maximum net exposure of the market to that Participant. This amount will be determined by the Operator in accordance with the rules, to include the net amount owed to the market for Transactions
### Exchange Rules Outline

already performed but not yet settled and an amount in respect of Transactions concluded but not yet delivered.

The Operator will be able to make a margin call if a Participant’s settlement exposure moves above its trading limit at any time.

3.5 Additional trading limits

The Operator will be authorised to set and modify additional limits for trading in any particular Product or group of Products or potentially for an individual Trading Participant. Trading Participants may be able to set their own limits, depending on system functionality.

The Operator will monitor the positions of Trading Participants on an ongoing basis against trading limits (but without liability for failing to prevent any limit being exceeded).
Exchange Rules Outline

3.6 Suspension of trading or access rights

The Operator may be entitled to suspend trading by a Trading Participant or its access to the Trading System where:

- the Participant fails to make a payment or satisfy a margin call when due;
- the Participant fails to deliver or receive at least 50% of a Transaction quantity for physical gas on a specified number of occasions within a defined period;
- the Participant is the subject of an insolvency event;
- AEMO reasonably believes the Participant is in breach of the market conduct rules;
- the Participant fails to remedy any other material breach of the rules within a specified period of notice from the Operator.

The rules will set out the steps the Operator must take prior to suspending trading rights and the applicable remedy and suspension periods based on the type of default event.

As a result of suspension, the Operator may take any or all of the following actions:

- drawing down collateral and bringing forward settlement;
- preventing the submission of Orders;
- suspending or removing open Orders;
- for insolvency and financial default, terminating all Transactions for delivery on a subsequent day, treating them as not delivered/receipted by the suspended Participant and calculating the compensation payable under the terms of the transaction.

The Operator will also have discretion to suspend a Non-trading Participant's access to the Trading System if a material breach of the rules is not remedied within a specified period of notice from the Operator.

The Operator will inform all other Trading Participants of the suspension of a Trading Participant on financial or delivery-related grounds.

4 The Trading System

4.1 Hours of trading

The Operator will provide access to the Trading System for trading in accordance with the market timetable published from time to time. (It is currently proposed that trading hours will be 9am to 5pm, 7 days.)
Exchange Rules Outline

4.2 Trading System unavailability

The Operator may suspend operation of the Trading System (either as a whole or only in relation to particular Products) at any time if it considers there has been a security breach or the system is not available for more than 15 minutes. Operation will not be suspended as a result of an individual Participant’s inability to access the Trading System, unless the Operator considers that the issue is likely to affect a significant number of Trading Participants or a significant volume of open Orders.

Contingency arrangements during a suspension of the Trading System may be included in the rules, or the Operator may have discretion to establish those arrangements. The nature and extent of contingency arrangements will depend largely on cost. In the absence of contingency arrangements:

- the Operator will notify all Participants of suspension and give as much notice as possible of reopening;
- open Orders at the time of suspension may be either ‘killed’ or rendered inactive (depending on system functionality);
- there will be a 30-minute pre-opening window to allow Trading Participants to resubmit (or reactivate and change) Orders.

4.3 Access

The rules, or separate terms of access incorporated into the Membership Agreement, will specify the applications and minimum interface requirements, including security, for the Participant’s interface with the Trading System.

4.4 Security

The Operator will use commercially reasonable efforts to ensure that the security systems and procedures designed to prevent unauthorised access to the Trading System are implemented and maintained, to the standard of a reasonable and prudent operator.

Each Participant will use commercially reasonable efforts to ensure that it maintains the security of its interface with the Trading System, to the standard of a reasonable and prudent market participant.
Exchange Rules Outline

4.5 Products
The list of Products offered on the exchange at any time will be maintained by the Operator. The Operator can add or remove Products on specified notice periods, and may list some, all or none on any day.

The terms of Products and specifications will be determined by the Operator after consultation with all Trading Participants. A consultation process will be set out in the rules.

Initially, the Products will be contracts for the delivery of a volume of gas on a day at specified delivery points. Refer to Outlines 2 and 3 in this document.

4.6 Information available
The Trading System will allow all Participants to view the following (anonymous) information for a specified period before and after a delivery day:

- the price and quantity of all open Orders;
- Transactions made by Product and delivery day;
- summary volumes and prices transacted by Product and delivery day;
- any Trading System notices; and
- pipeline capacity listings as provided to the Operator.

In addition, Trading Participants will be able to view contact details for the Trading and Settlement Representatives of other Trading Participants admitted to trade in the same Products.

Orders, Transactions and credit details of an individual Trading Participant are confidential information and can only be viewed by that Trading Participant. The Trading System will allow a Trading Participant to view its:

- organisational and contact details as registered by the Operator;
- current Orders;
- executed Transactions, including price, quantity and delivery point;
- current trading position relative to financial and other trading limits;
- Transactions awaiting confirmation of delivery;
- delivered quantities confirmed, including tolerances and default payments; and
- settlement statements and supporting data.

The rules will acknowledge that the Operator may make certain information publicly available, including quantities and values traded by Product, high/low, opening/closing, and volume weighted average prices, in each case
Exchange Rules Outline

aggregated for a period of a day, week or month.

4.7 Communication and data protection

Communications relating to trading will be via the Trading System only unless otherwise provided in the rules.

The receipt by the Operator of an Order from a Participant via the Trading System will be sufficient to verify that the Participant originated the Order such that the Participant will be bound by all Transactions arising if the Order is accepted.

The rules will provide for compliance with data protection laws. For example, SMS may be used in some circumstances.

4.8 Records

The Operator will be entitled to destroy Trading System records after seven years. Participants and former participants will be entitled to copies of records relating to their own trading, subject to paying the Operator’s costs.

5 Trading

5.1 Orders

The rules will set out the arrangements by which Transactions for a Product are entered into such that:

- Trading Participants will submit Orders to the Trading System specifying the relevant Product, the price and whole number multiples of the relevant tick size (specified in the Product schedule), the characteristics of the Order such as whether partial acceptance is permitted and any other details required by the Trading System for that Product or generally;

- Orders will be submitted and available for acceptance during a trading window for each Product in accordance with the market timetable;

- unless rejected by the Operator, Orders will be displayed in the Trading System (anonymously);

- unless already accepted, Trading Participants will be able to withdraw Orders (subject to the market conduct rules); and

- the Operator will match Bids and Offers.

Once matched, Orders will cease to be displayed.

Partial matching of Orders is permitted unless otherwise specified in the Order, subject to a minimum contract quantity specified in the Product schedule.

5.2 Rejection, withdrawal and lapse

The Operator will be entitled to reject any Order (including an acceptance of an Order) or (if already posted), withdraw an Order where:

- trading has been suspended;
Exchange Rules Outline

- the Order does not comply with the rules;
- the Order, if matched, would cause the Trading Participant to exceed its trading limits;
- the Trading Participant has already exceeded its trading limits; or
- the Trading Participant has been suspended from trading.

The Operator will notify the Trading Participant of the rejection or withdrawal as soon as possible. Orders will lapse either at the time specified in the rules for a particular Product or at the time specified in the Order.

5.3 Matching Orders

The Trading System will match Orders where a Bid and Offer for a Product from different Participants match in terms of quantity, price, delivery point and delivery day. If there are multiple matching Offers and Bids, priority will be given to the best available price, followed by the first in time submitted to the Operator.5

5.4 Trades in error

The rules will make provision for cancellation of matched Orders or confirmed Transactions that have been concluded where there is a manifest error.

5.5 Transaction confirmations

Once matched, the Operator will send a confirmation of the transaction to the Trading Participants concerned.

5.6 Effect of confirmation

When the confirmation is sent, there is a confirmed Transaction under which:

- the Participant submitting the Offer is the Seller and must meet its delivery obligations, in return for which it is entitled to the corresponding payment from the Operator in the settlement process; and
- the Participant submitting the Bid is the Buyer and will have the benefit of delivery by the Seller (and must accept that delivery) and in return, must make the corresponding payment to the Operator in the settlement process.

The terms of each Transaction are the same as the terms of the underlying Product with the price, quantity, delivery point and delivery period being those specified in the Order.

The rights and obligations of Trading Participants with respect to delivery of Transactions are described in section 6 below.

The rights and obligations of Trading Participants and the Operator with respect to settlement of Transactions are described in section 7 below.

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5 Pricing and matching processes will be reviewed based on system functionality.
Exchange Rules Outline

6  Delivery

6.1 Delivery Each Participant will be responsible for delivery of each Transaction to which it is a party. Currently, Participants will not be able to net deliverable quantities\(^6\) nor cash settle.

The process by which a Transaction is delivered will depend on the Product category, since different rules will be needed for Physical Gas, capacity and hub services. The delivery rules for Physical Gas are described below.

6.2 Delivery for Physical Gas For each Transaction for Physical Gas:

- the Seller must make available for delivery to the Buyer, the contract quantity at the delivery point during the delivery period; and
- the Buyer must accept for delivery from the Seller, the contract quantity at the delivery point during the delivery period.

The Seller and the Buyer will perform these obligations by making appropriate nominations to the gas transporter and/or supplier under gas transportation/supply agreements and participating in the gas allocation arrangements for the delivery point.

Quantities of gas delivered or received and other matters such as gas quality will be determined using the underlying transportation agreement and allocation agreement.

6.3 Transfer of title Title to gas delivered under a Transaction for Physical Gas will transfer at the delivery point, in accordance with the gas allocation arrangements in the underlying gas transportation agreements.

6.4 Market disruption No market disruption events are proposed for the initial Products.

6.5 Delivery failure If the Operator is notified of a failure to deliver, or a failure to accept delivery (including over or under delivery - see section 6.6), the Operator will calculate any amount payable in respect of that failure under the terms of the Transaction.

For details of proposed delivery tolerances and payments for Physical Gas, refer to the Product Schedules.

The sole remedy of any Participant and the Operator under the rules for failure to deliver or accept the agreed quantity will be as defined by the rules for that Product.

6.6 Delivery confirmation Because the Operator will not have direct access to the allocation data from gas transporters, the Operator will assume the contract quantity was delivered and accepted in

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\(^6\) For example, a Participant may have an obligation to deliver contract quantity Q1 at a delivery point, and a right to receive contract quantity Q2 at the same delivery point in the same delivery period. If the Participant fails to deliver any gas during the delivery period, its obligation to make payments in respect of that non-delivery will be based on Q1, not on Q1 - Q2.
Exchange Rules Outline

full unless otherwise advised by the Participants.

The Buyer or the Seller may notify to the Operator any difference between the delivered quantity and the contract quantity, within a specified time after the delivery day (the cut-off date for revised settlement). However, the Operator must not accept a variation unless and until both Participants have confirmed the same delivered quantity.

Once the final date has passed, neither Participant will be able to make any further claim in the settlement process under the rules for any over or under delivery in respect of the relevant Transaction. This will not affect any right of the Buyer or the Seller to pursue any other remedy it may have.

If the Buyer and Seller have not confirmed a matching delivery quantity as at the cut-off date, the Operator will settle the contract quantity.

7 Settlement

7.1 Transaction settlement

Settlement will take place after the end of each settlement period (calendar month) for all Transactions with a delivery period ending in that settlement period.

Payments in respect of all Transactions will be owed to or by the Operator. There will be no debtor-creditor relationship between any Participants in respect of Transactions. This structure will be put in place to share credit risk among Trading Participants, to allow the Operator to calculate the position of each Trading Participant against its financial trading limits on a net basis, to simplify the collateral arrangements and (in conjunction with collateral requirements) to mitigate the risk of a payment shortfall on insolvency of a Trading Participant. Trading Participants (and not the Operator) will bear all market credit risk.

Settlement amounts for a Participant for a settlement day will be calculated across all Transactions, regardless of the delivery point, so that the amount owed to or owing by the Participant is:

- total amounts owed by the Participant in respect of Transactions; plus
- any fees owed by the Participant; less
- total amounts owed to the Participant under Transactions.

In other words, payment netting will apply so that a Participant will owe to the Operator, or be owed by the Operator, a net amount.

7.2 Settlement revision

One routine settlement revision will take place 6 months after the end of each settlement period. No further revisions
Exchange Rules Outline

will be made unless there is manifest error.

7.3 Invoicing and payment
The Operator will be responsible for invoicing.

Payment arrangements will be included in the rules and will include the usual arrangements for dealing with errors, using estimates, corrections etc. Amounts in dispute must be paid pending resolution of the dispute.

Interest will be payable for late payments.

7.4 GST
All amounts will be expressed exclusive of GST and GST will be payable by the recipient of a taxable supply. The rules will include provision for the issue by AEMO of tax invoices and recipient created tax invoices.

7.5 Carbon pricing
The rules will be drafted on the assumption that Transactions will not be taxable supplies under section 33 of the Clean Energy Act 2011 (Cth).

7.6 Payment failures
If a Participant fails to pay, then:

- the Operator will first realise any collateral provided by the Participant in default;
- if there remains a shortfall, payments to Trading Participants not in default will be reduced pro-rata to the amounts owed in that settlement cycle; and
- if there is any remaining shortfall, Trading Participants not in default will be required to pay the Operator the balance to make up the shortfall, pro-rata to the amounts owed in that settlement cycle.

Amounts subsequently recovered by the Operator, if any, from the defaulting Participant will be applied first to the costs of recovery and then will be repaid pro-rata to the Participants who funded the shortfall through this mechanism.

8 Other matters

8.1 Disputes
Disputes about the application or operation of the rules or performance of any Transaction will first be subject to an informal dispute resolution mechanism. The process will be initiated by one party to the dispute giving notice to the other parties to the dispute. The parties to the dispute will be required to nominate an executive who will participate in dispute resolution negotiations.

During this stage of the dispute resolution process, parties may nonetheless seek the assistance of the courts for urgent injunctive or declaratory relief.

If informal dispute resolution does not resolve the dispute within the time specified in the rules, then (unless the
Exchange Rules Outline

parties agree between them to use a process such as mediation), any party to the dispute may take the matter to the courts for resolution. The courts of Queensland will have non-exclusive jurisdiction.

For disputes about delivered quantities under any Transaction, the Buyer and Seller to the Transaction (and not the Operator) are responsible for reaching a resolution. The dispute resolution mechanism for these disputes may be governed by the rules of the underlying allocation arrangement. The Buyer and Seller must pay the costs incurred by the Operator, if any, in connection with the resolution of the dispute in equal shares, or in the shares determined under the dispute resolution process.

It is intended that a Participant must pay any disputed amount payable in accordance with the applicable rules on the due date. This will not affect the Participant’s right to pursue a dispute under the rules.

8.2 Confidentiality

The confidentiality obligations will extend to commercially confidential information disclosed by one person to another under the rules or under or in relation to any Transaction including the identity of any counterparty to the Transaction.

Each party will be required to keep the confidential information confidential and not disclose it accept within the circumstances permitted by the rules.

The permitted disclosure regime will be without prejudice to obligations to keep confidential any access codes for the Trading System.

8.3 Warranties and indemnities

Warranties will cover matters such as capacity, authority, solvency, no breach, no reliance, obligations binding, risk assumption, no advice, and accuracy of information.

Indemnities will be considered further as the rules are developed and are likely to include IP indemnities and indemnities relating to confidential information.

8.4 Liability

To the extent permitted by law, the Operator will not be liable to any Participant for any act or omission in connection with the rules or a Transaction, whether arising in contract, tort (including negligence), breach of duty or any other ground, unless the act or omission was done or made in bad faith.

To the extent that liability cannot lawfully be excluded, the Operator’s statutory immunities and limitations of liability will apply.

For both the Operator and Participants, any liability under or in connection with the rules will be limited to direct losses (not including direct losses in the nature of loss of profit or loss of revenue). Liability for “consequential loss” will be excluded. Consequential loss will be defined broadly so as
DETAILED DESIGN FOR A GAS SUPPLY HUB AT WALLUMBILLA

Exchange Rules Outline

to give effect to the exclusion of loss of profit and loss of revenue and other similar heads of loss. However, these limitations and exclusions will not apply to:

- payments required to be made in respect of Transactions such as payments for non-delivery or Transaction close out payments;
- amounts required to be paid under an indemnity, subject to any applicable cap;
- specified breaches giving rise to third party claims, such as breaches of IP warranties or confidentiality obligations;
- liability arising from any act or omission done or made in bad faith.

The liability provisions in the rules will be without prejudice to any rights that a party may have in respect of a breach of the market conduct rules arising under the National Gas Rules or National Gas Law.

8.6 Force majeure Force majeure events, for the purposes of the rules, will only cover events which prevent the performance by parties of their obligations under the rules. Force majeure may result in suspension of obligations under the rules (except for obligations to pay money) and may also give the Operator rights to suspend operation of the rules until the force majeure event can be prevented or overcome.

The Operator will have powers to take steps to deal with events that detrimentally affect the smooth running of the Trading System.

The application of force majeure principles to a particular Product will depend on the terms of that Product. For example, delivery of a Transaction for Physical Gas will not be excused by an event preventing the physical delivery of gas.

8.7 Intellectual property All intellectual property rights in the market, the Trading System and its content and layout will be owned by the Operator or its licensors and subject to copyright. Detailed rules will cover use, copying, modification, and disclosure of those materials.

8.8 Assignment and subcontracting The Operator will be entitled to subcontract the performance of all or any part of its obligations.

The rules will include a process to change the identity of the Operator (as principal).

Participants will not be able to assign or novate their Participant rights or Transactions.

8.9 Other boilerplate Boilerplate provisions will be included covering waiver, invalidity, assignment, entire agreement and notices.

8.10 Governing law Queensland, for both the rules and all Transactions.
### Outline 2: Physical Gas – Day Ahead

#### Physical Gas Outline – Day Ahead Product

<table>
<thead>
<tr>
<th></th>
<th>General</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Scope</td>
</tr>
<tr>
<td></td>
<td>Sets out the Product details and the terms of Transactions for delivery of gas at one of the delivery points, for Transactions concluded on the exchange before the day-ahead trading deadline for the delivery day.</td>
</tr>
<tr>
<td></td>
<td>There will be separate Products for each delivery location (ie each relevant pipeline). Where applicable, the delivery points will be one or more specified runs on that pipeline.</td>
</tr>
<tr>
<td></td>
<td>Otherwise, the same terms will apply to all delivery points.</td>
</tr>
<tr>
<td>1.2</td>
<td>Definitions and interpretation</td>
</tr>
<tr>
<td></td>
<td>Terms defined in the exchange rules and not defined here will have the meaning in the exchange rules.</td>
</tr>
<tr>
<td></td>
<td>Definitions specific to these terms and interpretation rules will be incorporated.</td>
</tr>
</tbody>
</table>

#### 2 Transaction details

<table>
<thead>
<tr>
<th>2.1</th>
<th>Transaction specification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>For each Transaction, the following will be determined by the exchange rules (which in turn provide for the values to be set by the terms of the accepted Offer):</td>
</tr>
<tr>
<td></td>
<td>• price;</td>
</tr>
<tr>
<td></td>
<td>• quantity (in multiples of 1 TJ);</td>
</tr>
<tr>
<td></td>
<td>• delivery point (where there are multiple possible delivery points for a delivery location, a Buyer must be able to accept delivery at any of those points – to be confirmed by the Seller);</td>
</tr>
<tr>
<td></td>
<td>• delivery day.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2.2</th>
<th>Gas specification, pressure etc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The gas specification applicable to the Transaction will be the specification corresponding to the delivery point, with the specifications included in schedules to the rules.</td>
</tr>
<tr>
<td></td>
<td>Delivery of off-specification gas must be notified to the Buyer and the Buyer can either accept the gas or reject it.</td>
</tr>
<tr>
<td></td>
<td>If the Buyer accepts off-specification Gas then the Seller is taken to have made the gas available for delivery.</td>
</tr>
<tr>
<td></td>
<td>If the Buyer rejects off-specification gas, the Seller is deemed to have failed to make gas available for delivery.</td>
</tr>
<tr>
<td></td>
<td>The gas must be delivered at the pressure that allows delivery into the pipeline at the delivery point.</td>
</tr>
</tbody>
</table>
Physical Gas Outline – Day Ahead Product

2.3 Rate of delivery
Gas must be delivered at an even flow rate through the day. As the market develops, new Products may be issued that allow for a delivery profile to be specified.

3 Delivery and settlement

3.1 Delivery
Refer to the exchange rules outline above, at section 6.

3.2 Constraints
The Seller will have no right to curtail deliveries where there is a transportation or supply constraint.

3.3 Delivery confirmation
Refer to the exchange rules outline above, at section 6.

3.4 Delivery tolerances and default payments
Each Transaction is for firm delivery of gas, but delivery/receipt failures may be excused by operational constraints on the pipeline.

The delivery obligation will be subject to a tolerance (a defined percentage of the contract quantity, possibly also subject to fixed volume limits), such that:

- within the delivery tolerance, or where the delivery/receipt variance is caused by operational constraints, payment is to be made for the actual delivered quantity at the contract price; and

- outside the delivery tolerance, the contract quantity will be settled at the contract price, and the party 'at fault' will pay or receive a default price for the variation quantity. This price will be set (probably as a percentage discount or premium to the contract price) so as to reflect the likely direct loss that would be incurred as a result of the under-delivery, over-delivery or under-receipt of gas.

3.5 Settlement
Refer to the exchange rules outline above, at section 7.

4 Other

4.1 Representations and warranties
The Participant will represent and warrant that it has all necessary capacity rights and authorisations to deliver or accept delivery of the contract quantity.

4.2 Liability
Will be governed by the exchange rules such that the sole remedy for delivery default will be the shortfall payment. This does not limit a Participant's right to pursue any remedy available to it for breach of another condition of the Transaction (e.g. unauthorised delivery of off-specification goods).

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8 It would be open to the Buyer and Seller to agree separately to use a different delivery profile or delivery point, since only the Buyer and Seller will have access to the allocation information from the gas transporter and the Buyer and Seller are responsible for notifying deviations to the Operator for settlement. Any agreement between a Buyer and Seller does not bind any other person.
<table>
<thead>
<tr>
<th></th>
<th>Physical Gas Outline – Day Ahead Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3</td>
<td>Dispute resolution</td>
</tr>
<tr>
<td></td>
<td>In accordance with the exchange rules.</td>
</tr>
<tr>
<td>4.4</td>
<td>Variation</td>
</tr>
<tr>
<td></td>
<td>Only in accordance with the exchange rules.</td>
</tr>
<tr>
<td>4.5</td>
<td>Boilerplate</td>
</tr>
<tr>
<td></td>
<td>In line with the exchange rules.</td>
</tr>
</tbody>
</table>
Outline 3: Physical Gas – Within-Day Product

### Physical Gas Outline – Within Day Product

<table>
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<th>General</th>
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<tr>
<td>1.1</td>
<td>Scope</td>
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<td>1.2</td>
<td>Definitions and interpretation</td>
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<thead>
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<th>Transaction details</th>
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| 2.1 | Transaction specification | For each Transaction, the following will be determined by the exchange rules (which in turn provide for the values to be set by the terms of the accepted Offer):  
- price;  
- quantity (in TJ);  
- delivery point. |
| 2.2 | Delivery start time | The start of the [hour] starting not earlier than [60 minutes] after the Transaction is confirmed by the Trading System. |
| 2.3 | Delivery period | Starts at the delivery start time and ends at the end of the gas day in which the delivery start time falls. |
| 2.4 | Gas specification, pressure etc | As for Day Ahead. |
| 2.5 | Rate of delivery | As for Day Ahead. |

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<th>Delivery and settlement</th>
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