High Level Design for a Gas Market in Western Australia
Gas Advisory Board
Draft Report

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MARKET REFORM

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Executive Summary

Introduction

The Independent Market Operator (IMO) engaged Market Reform to develop a high level design for a gas spot market in Western Australia. The purpose of the high level design is to provide a basis for further consideration of a gas market by the Gas Advisory Board (GAB), assess impacts and estimate costs. Market Reform and the IMO conducted interviews with a selection GAB members and industry stakeholders to assist in the specification of guiding principles and the high level design.

The recommendations relate to both a base design and an extended design. The base design minimises the degree of change by operating as an overlay on current gas supply, balancing and transportation arrangements at the proposed hub locations. We recommend the base design if the GAB wants to achieve the main benefits of a gas market without requiring material change to current contractual and operating arrangements. The extended design provides greater benefits, though at some increase in implementation cost. We recommend further consideration of these market features and their implementation where industry is willing to make the required contractual and operational changes.

Scope

The scope is to develop a high level design of the core trading and settlement functions for a gas market in Western Australia. The IMO has provided a set of Guiding Principles (see Section 2.1) to be accounted for in developing the high level design.

The Base Design

Hub Locations

It is proposed that a spot market for the wholesale trading of natural gas is developed at physical gas trading hubs based around the Carnarvon Basin gas fields and the Mondarra Gas Storage Facility (MGSF). The Carnarvon Basin hub, defined by the inlet points to the Dampier to Bunbury Natural Gas Pipeline (DBNGP) from the Carnarvon Basin gas fields, has the potential to pool together producers and shippers operating in the Pilbara region. The Mondarra hub, located at the connection point between the MGSF and the DBNGP, could meet balancing and short-term portfolio requirements of trading participants.

Participation

Participation in the market will be voluntary and will be open to all gas market participants with the capability to deliver or receipt gas at a hub.

The market operator will implement and operate the trading platform, settle transactions, monitor settlement exposures and hold credit support. The IMO is well positioned to carry out the role of market operator because of the capabilities and facilities it has established to carry out its role as operator of the Western Australian Gas Bulletin Board (GBB) and as operator of the Wholesale Electricity Market (WEM).

Facility operators will not have a direct role in the market as the delivery of transactions will be carried out by trading participants in accordance with their gas supply and transportation contracts.

Trading

Products for physical delivery of gas to a hub, for spot and short-term forward delivery periods, will be traded on an exchange platform. The exchange will match buy and sell orders to form transactions continuously during the opening hours of the market.

Services to support the trading of pipeline capacity will be developed including a platform for matching buyers and sellers, standard trading terms and settlement of transactions. Facility operators are encouraged to provide transfer services to shippers to increase the efficiency of secondary trading of pipeline capacity.

Gas Delivery

Transactions will create a firm obligation for the seller to deliver gas to the hub and for the buyer to receipt gas at the hub. The gas delivery process will be based on a bilateral mechanism where the buyer and seller will be responsible for the delivery of gas utilising their pipeline contracts. Trading participants will also be responsible for calculating and communicating actual delivery quantities to the market operator for settlement purposes.

Settlement and Prudential

The market operator will regularly settle transactions, gas delivery variations and fees with trading participants. Trading participants must provide credit support to the market operator to cover their settlement exposures.

Market Information

Trading participants will receive reports containing information to support their participation in the market including; confirmation of order submission and the execution of transactions, details required to fulfil their gas delivery obligations, actual gas delivery quantities, invoices and settlement supporting data.

The transparency of gas prices would be enhanced by publication of the price and quantity of transactions carried out through the spot market.

Legal Framework and Funding

The legal framework could be set out in suite of regulatory instruments including an act, regulations and rules or it could take the form of a contractual agreement between the market operator and trading participants. The IMO is governed by rules and as such some components of the legal framework, in particular the enabling of the market and the high level market framework, should be rules based. The framework for the product specifications and the standard terms for trading, gas delivery and settlement should allow the market to provide a timely response to developments required by trading participants.

The cost of implementing and operating the gas market should, to the extent practicable, be recovered from gas market participants. Sponsorship of the market by participants should be considered further as a means of providing greater financial certainty and as a commitment to the market implementation and its on-going development. Ideally market fees would be paid by trading participants when they participate in the market through a variable transaction fee. However, recognising uncertainty of transaction volumes associated with a voluntary market, funding of the market may also require fixed participation fees or a guarantee from industry or government for the recovery of costs.

Extended Market Design

Extended functionality could be incorporated into the design, increasing the benefits from having a gas market though with some degree of change and additional cost required to implement the market. The extended market features are largely independent of each other and their implementation should be driven by industry.

Hub Locations

Intra-hub transfer services – which involve arrangements to allow gas traded at one point within a hub to easily be moved to another – could extend the definition of each hub to increase the number of participants that can participate in the market. The definition of the Carnarvon Basin hub would be extended to include all pipeline inlet and outlet points in the Pilbara region. While the Mondarra hub could be extended to allow the direct participation of shippers on the Parmelia Gas Pipeline (PGP).

Forward Products

The delivery period of products could be extended further into the future to include monthly and quarterly products. The trading of forward products generate larger exposures compared to the spot market and as such should be supported by the prudential processes of a clearing house.

Pipeline Capacity Products

Standardised trading terms and the regular trading of unused pipeline capacity could provide a base for the future development of exchange traded pipeline capacity products.

Gas Delivery Obligations

The netting of gas delivery obligations across offsetting buy and sell transactions (for the same hub and delivery gas day) would reduce administration for trading participants. The netting of gas delivery obligations would require a system for matching the net buy and sell positions of trading participants and would require the market operator to be licenced or seek exemption to the financial services provisions of Chapter 7 of the Corporations Act.

Gas Delivery Mechanism

The direct exchange of transaction data between the facility operator and the market operator would reduce administration for trading participants and would allow trading counterparts to remain anonymous.

Gas Delivery Confirmation

The direct confirmation of gas deliveries by the facility operator would reduce administration for trading participants and the timely provision this data would provide more certainty of settlement outcomes and reduce credit support requirements.

Settlement and Prudential

Combining the settlement of the proposed gas market and the electricity market (WEM) could be of value to gas powered generators through the reduction of circular cash flows and the netting of credit support requirements.

1. Introduction

The Independent Market Operator (IMO) engaged Market Reform to develop a high level design for a gas spot market in Western Australia. The purpose of the high level design is to provide a basis for further consideration of a gas market by the Gas Advisory Board (GAB), assess impacts and estimate costs. This report does not consider gas market design issues in detail nor does it consider issues relating to the implementation of the market.

This report follows the presentation of the *Gas Market Design Considerations* paper at the February meeting of the GAB where it was identified that the main drivers for a market are the establishment of an efficient, transparent and independent trading platform and robust settlement and prudential arrangements.

Market Reform and the IMO conducted interviews with a selection GAB members and industry stakeholders to assist in the specification of guiding principles and the high level design outlined in this report.

The recommendations outlined in this report relate to both a base design and an extended design. The base design minimises the degree of change by operating as an overlay on current gas supply, balancing and transportation arrangements. The extended design increases the benefits of a gas market though with some degree of change required to implement the market.

This report is structured as follows:

- Section 2 outlines the scope and guiding principles for the design of a gas spot market.
- Section 3 defines the key terminology used in this report.
- Section 4 discusses gas market design options.
- Section 5 outlines the high level design.

2. Scope and Guiding Principles

2.1. Scope

The scope requires Market Reform to develop a high level design for a gas market in Western Australia. The gas market should be voluntary, simple, liquid, inexpensive to implement and operate and should minimise the impact on current supply and transport contracts. The high level design is required to address the following topics:

- Location of hubs.
- Products that could be traded in the market.
- Pipeline capacity trading.
- Settlement and prudential arrangements.
- Legal framework and cost recovery.

2.2. Guiding Principles

The principles outlined in the table below will guide the design of a gas market in Western Australia. The term "gas market" may refer to one or more instances of a gas market at different locations in Western Australia.

#	Principle
1	**Facilitate competition between buyers and sellers** The gas market should facilitate competition between potential buyers and sellers of gas and pipeline capacity through an efficient and cost effective trading mechanism.
2	**Maximise participation** Participation in the gas market should be voluntary and should be accessible to as many wholesale gas market participants and traders as possible. The gas trading hub should be designed, to the extent practicable, to meet the needs of potential trading participants.
3	**Minimise transaction times and costs** The market arrangements for the formation and settlement of transactions should be simple and efficient and should minimise the total transaction times and costs to participants.
4	**Enhance transparency** Transaction prices should be published to give transparency to the value of gas and pipeline capacity. Statistics on traded quantities should also be published.
5	**Anonymous trading** The identities of participants involved in trades should remain confidential except where the identities are required for gas delivery purposes.
6	**Full collateralisation of settlement risks** Settlement risks should be estimated and monitored and should be fully collateralised by trading participants.
7	**Avoid the requirement to change gas pipeline arrangements** The gas market should not obligate changes to existing pipeline scheduling and commercial arrangements but should not preclude evolution of these arrangements by industry.
8	**Maximise consistency with existing Shipper / Producer trading conventions/processes** The gas market conventions/processes should, to the extent practicable, be consistent with conventions /processes already established in Western Australia.

#	Principle
9	**Independent governance of trading arrangements** Appropriate governance arrangements should exist so that there is a level playing field for trading participants and there is confidence in market outcomes.
10	**Minimise system impacts on participants** The gas market data exchange conventions should minimise inconsistencies with existing participant systems used for similar functions in Western Australia and elsewhere in Australia.
11	**Cost recovery** The cost of implementing and operating the gas market should, to the extent practicable, be recovered from gas market participants recognising uncertainty in the level and growth of transaction volumes. The cost recovery arrangements should be relatively simple, efficient and cost effective in and of themselves.

3. Introduction to some key terminology

This section provides short descriptions of key terminology used in this report which may be helpful to readers.

Physical Equipment and Operators

- Facilities: Gas transmission pipelines and gas storage facilities.
- Facility operator: The operator of a gas transmission pipeline or a storage facility.
- Market operator: Implements and operates the core function of the market including the trading platform, settlement of transactions, monitor settlement exposures and holds credit support.
- Shipper: Term used in this report to refer to a customer of a gas transmission pipeline or a gas storage facility that is entitled to transport or store gas in a facility.

Contract and Transaction Terminology

- Imbalance trade: Service offered to shippers on the Dampier to Bunbury Natural Gas Pipeline (DBNGP) that allows an Accumulated Imbalance to be traded with another shipper that has the effect of reducing the Accumulated Imbalance of both shippers.
- In-ground transfer: Service offered to shippers on the Mondarra Gas Storage Facility (MGSF) that allows title of gas in the storage facility to be transferred to another shipper.
- Inlet producer sale: Sale of gas by a producer to a shipper for delivery at the inlet point to the DBNGP. The producer, as agent for the shipper, informs the DBNGP of the quantity of gas to be allocated to the shipper in accordance with the transaction.
- Inlet shipper sale: Sale of gas by a shipper to another shipper for delivery at the inlet point to the DBNGP. Facility provided by the DBNGP allows a shipper to on-sell gas it has purchased from another party at the inlet to the DBNGP. Shippers register inlet sales with the DBNGP so that they can be reflected in the shipper nominations and allocations.
- Maximum Daily Quantity (MDQ): The pipeline capacity contracted by a shipper that can be utilised on a gas day.
- Multi-shipper Agreement: Agreement that defines the allocation of gas between shippers at an inlet point or an outlet point of the DBNGP.
- Pipeline contract: Contract between a facility operator and a shipper including a Gas Transportation Agreement (GTA), storage agreement or other pipeline related service agreement.

Trading Terminology

- Buyer: makes bids to buy a quantity of gas at a specified price. Once a buyer has entered into a transaction they must receipt the transacted quantity of gas at the hub. A buyer must have the contractual right with the relevant facility operator to receipt gas at the hub (or re-direct to another facility).
- Seller: makes offers to sell a quantity of gas at a specified price. Once a seller has entered into a transaction they must deliver the transacted quantity of gas at the hub. A seller could be a producer, a shipper that has taken title to gas from a producer (or another shipper) or a shipper with gas stored in a facility.
- Trading participant: An entity registered to participate in the market that is permitted to enter into transactions. i.e. it can be a buyer or a seller.
- Exchange: A market where gas or other commoditised products can be bought and sold.
- Exchange traded: Term given to a highly standardised product that is capable of being traded on an exchange.

- Matching engine: Feature of a trading platform that pairs together a bid and an offer in a specified product to form a transaction, comprising a transaction price and quantity.
- Pipeline capacity trading: Provision of short-term pipeline[1] services by facility operators and the facilitation of secondary trading of pipeline services.
- Secondary trading: Trading of a commodity or service after it has been issued in the primary market. In the case of pipeline capacity, the primary allocation is between a facility operator and a shipper while secondary trading is the on-selling of a service from one shipper to another.

Processes and Services Terminology

- Balancing service: Service provided by a facility operator or shippers on a facility to correct for any imbalance between actual gas flows and a quantity of gas transacted at the hub. If there is no balancing service then a mechanism is required to financially settle any variations between the actual quantity of gas delivered and the transaction quantity.
- Operational Balancing Agreement (OBA): Agreement between facility operators to balance physical gas flows at a connection point between facilities. Under the agreement the facility operators resolve imbalances resulting from a difference between scheduled flows and the actual physical gas flow.
- Gas delivery process: the process of gas delivery and receipt at a hub from nominations and scheduling though to metering and allocations.

[1] Pipeline capacity services refer to gas transportation or gas storage services offered by a pipeline or storage facility.

4. Discussion of Design Options

This section provides a discussion of the key components of a gas market design. Section 5 presents the high level design.

4.1. Market Model

A range of different gas market models were outlined in the *Gas Market Design Considerations* paper presented to the February meeting of the GAB including:

- A gas trading hub (or supply hub) is a market for the wholesale trading of natural gas. A trading hub is typically a location with a significant concentration of supply or a major trans-shipment point.
- A demand hub, like the Short-Term Trading Market (STTM) in Sydney, Adelaide and Brisbane, allows gas users and shippers to trade transmission pipeline delivered gas at the point of delivery to a distribution network.
- A market carriage model, like the Victorian Gas Market, uses a much more sophisticated scheduling arrangement where bids and offers at different locations are used to centrally schedule all injections and withdrawals into the network. This differs from the more common contract carriage model where gas is scheduled separately with each pipeline operator.

A physical gas trading hub market model is proposed for Western Australia because of the concentration of supply, distributed nature of gas demand (rather than being concentrated around a distribution network) and the principle of a simple market design that minimizes the impact on existing contractual arrangements.

4.2. Fundamental Hub Design Decisions

This section outlines the key decisions that need to be made in designing a gas trading hub. These key design decisions have flow on implications for the trading, gas delivery and settlement features of the market.

Market Feature	Option	Description	Pro's	Con's
Gas Balancing Arrangements[2]	Physical hub with balancing service or virtual hub[3] with balancing service. *For example, transfer of gas in a pipeline or gas in a storage facility.*	A balancing service at the hub corrects for any under or over delivery to ensure that a transaction is delivered in full to the buyer.	Subject to force majeure, the actual delivered quantity will equal the transaction quantity. As such, no mechanism is required for the settlement of delivery variations. Reliable gas deliveries. More certainty of settlement outcomes and lower credit support requirements.	There would be costs and contractual changes required to implement and maintain a balancing service for the market.
	Physical hub[4] specifically no balancing service. *For example, inlet to DBNGP at a major supply point.*	Location at which gas flows between a major supply point and a pipeline or between pipeline(s) and a storage facility. The quantity of gas transferred and allocated to the buyer is based on the actual throughput at the hub and as such can vary from the transaction quantity.	Avoids costs and contractual changes required to implement and operate a balancing service for the market.	The actual quantity may vary from the transaction quantity. As such, a mechanism is required for the settlement of any variations between the actual delivered quantity and the transaction quantity. Reduced reliability of gas deliveries. Higher credit support requirements.

[2] Balancing arrangements discussed in this section are separate from the balancing service applicable to parts of the Perth gas distribution network.
[3] A virtual hub could be a notional trading point.
[4] We do not consider a virtual hub without a balancing service. A virtual hub matches transactions between participants at different locations in the network as if they were at the same location. A balancing service is required to ensure the secure operation of the hub given this fiction.

Market Feature	Option	Description	Pro's	Con's
Gas Delivery Mechanism	Counterparty: Bilateral	Parties to a transaction organise the delivery of gas in accordance with their contractual agreements with the relevant facility operator/s.	Avoids costs, pipeline contracts need not change to implement a direct mechanism between the market operator and the facility operator. However, with the IMO as the market operator these changes should be relatively minor given the facility operators have established an interface with the IMO for the provision of gas bulletin board data.	Counterparty details are provided to the buyer and seller by the market operator. Operational costs for buyer and seller associated with the delivery of gas – specifically nominations, calculating the delivered quantity and communicating this information to the market operator.
	Counterparty: Facility operator (i.e. 'multi-lateral')	Transactions (or net positions) are provided directly to the relevant facility operator/s by the market operator.	Transaction counterparties remain anonymous. Allows automation of the gas delivery process which reduces administration for trading participants.	Cost and pipeline contract changes associated with establishing the mechanism.
Delivery Obligation	Individual transaction	Trading participant must deliver or receipt gas for each individual transaction.	Avoids system development costs and licencing requirements that would be associated with the netting of gas deliveries.	More administration for trading participants associated with nominations, scheduling and settlement processes. However, this administration should be manageable for spot products.
	Delivery netting	Trading participants need only deliver or receipt their net gas deliveries.	Less administration for trading participants associated with nominations, scheduling and settlement processes. Transaction details remain anonymous, only information relating to net positions is exchanged between trading participants.	Consideration of the financial services licencing implications of netting in accordance with Chapter 7 of the Corporations Act is required. Note that the Gas Supply Hub was provided with an exemption for the trading of delivery netted products. Additional systems development associated with developing the delivery netting functionality.

Market Feature	Option	Description	Pro's	Con's
Delivery Confirmation	Trading participants provide confirmation	Trading participants calculate the actual quantity of gas delivered based on allocation data provided by their facility operator. Trading participants then provide the actual gas delivery information to the market operator for settlement purposes.	Avoids any costs and contractual changes for the facility operator in setting up and maintaining this function. However, note that the costs should be relatively low given facility operators already perform certain allocations and they have established an interface with the IMO for the provision of gas bulletin board data.	More administration for trading participants, potential for disputes between trading participants. Uncertainty associated with actual gas deliveries and settlement outcomes. Higher credit support requirements associated with the delay between the gas day and the confirmation of gas delivery[5].
	Facility operator provides confirmation	The facility operator allocates gas and provides actual delivered quantities to the market operator for settlement purposes.	Less administration for trading participants. Timely confirmation of gas deliveries increases certainty of actual gas deliveries and settlement outcomes. Reduces credit support requirements for trading participants.	Costs and contractual changes for the facility operator in setting up and maintaining this function.

[5] On the MGSF and other facilities operated by APA indicative allocations are provided to shippers on the day after the gas day and final allocations are provided to shippers seven days after the end of the month. Final allocations at inlet points on the DBNGP are provided to shippers on the day after the gas day.

Market Feature	Option	Description	Pro's	Con's
Settlement and Prudential Model	Bilateral	Buyer and seller financially settle all transactions and any variations. All billing, credit support and prudential processes carried out bilaterally between the trading participants.	Avoids the need for the market operator to establish a settlement and prudential function. However, with the IMO as the market operator the WEM settlement and prudential capabilities could be leveraged to deliver services to the gas market.	Only trading participants with a bilateral trading (master) agreement can be matched on the trading platform. Trading participants would need to maintain and provide a list of authorised counterparties to the market operator.
	Centralised (or market settlement)	The market operator settles all transactions, collecting payments from buyers and making payments to sellers.	The trading platform can match any buyer with any seller. Allows settlement of a single invoice for all transactions in a billing period. Reduces duplication of bilateral credit support. Market operator estimates and monitors prudential exposure.	The market operator must establish a settlement and prudential function for the gas market.

4.3. Participation in the Market

It is proposed that participation in the market is voluntary. The proposed market will overlay current gas transportation and supply contracts and as such to participate in the market an organisation will need to have the capability to deliver gas to the hub or to receipt gas from the hub.

Potential trading participants include gas producers, gas powered generators (GPGs), large industrial users and gas retailers. Financial institutions could also participate in the spot market if they can access flexible transport or storage services, either on a pipeline or at dedicated storage facilities. It is important that the market meets the needs of these potential trading participants and that the design of the market has the flexibility to evolve with the trading requirements of industry.

The market operator will register participants, implement and operate a trading platform, settle transactions, monitor settlement exposures and hold credit support. The IMO is well positioned to carry out the role of market operator because of the capabilities and facilities it has established to carry out its role as operator of the Gas Bulletin Board (GBB) and the Wholesale Electricity Market (WEM). Through its role as the operator of the WEM, the IMO could also realise potential synergies between the gas and electricity markets. It is understood that some enabling legislation would be required for the IMO to act as the market operator. The delivery of services by the market operator (i.e. new build, outsource) is beyond the scope of this report.

The base model proposed for the market does not require any direct participation in the market by facility operators. Facility operators would schedule the delivery of gas in accordance with contractual nominations received from their customers. An extended model for the market is the direct participation of facility operators in the market to streamline the gas delivery processes including nominations and the confirmation of deliveries for settlement purposes.

4.4. Hub Locations

At least one gas trading hub must be defined, though multiple hubs could be defined at different locations.

Potential trading hubs have been identified at the Carnarvon Basin gas fields and the Mondarra Gas Storage Facility. These locations have been selected because they have the potential to pool together buyers and sellers and to leverage off existing transfer, balancing and other pipeline related services that support the trading of gas.

The definition of a hub is the specific physical location or locations at which gas must be delivered to in accordance with market transactions. The challenge in defining each of the hubs is balancing the principles of simplicity and avoiding mandated changes to existing contracts against maximising participation and liquidity. It is recommended that further analysis and consultation on the hub definitions is undertaken during a detailed design phase of the market implementation.

Carnarvon Basin

Gas fields in the Carnarvon Basin supply the majority of the Western Australian domestic gas market. A hub based around this supply source has the ability to pool together gas producers in the Carnarvon Basin as well as gas users and retailers shipping gas on the DBNGP, Pilbara Energy Pipeline (PEP) and Goldfields Gas Pipeline (GGP).

The simplest definition of the hub is to select one major inlet point as the physical location for gas trading. However, producers that do not supply gas at the designated inlet point would need to arrange for the transport of gas to the hub potentially placing them at a disadvantage to other sellers. The ideal would be to select a physical location that all producers have similar access to (e.g. Compressor Station 1 (CS1) on the DBNGP). However, it is understood that on the DBNGP there is currently no mechanism for transferring title at locations other than an inlet or outlet point to the pipeline.

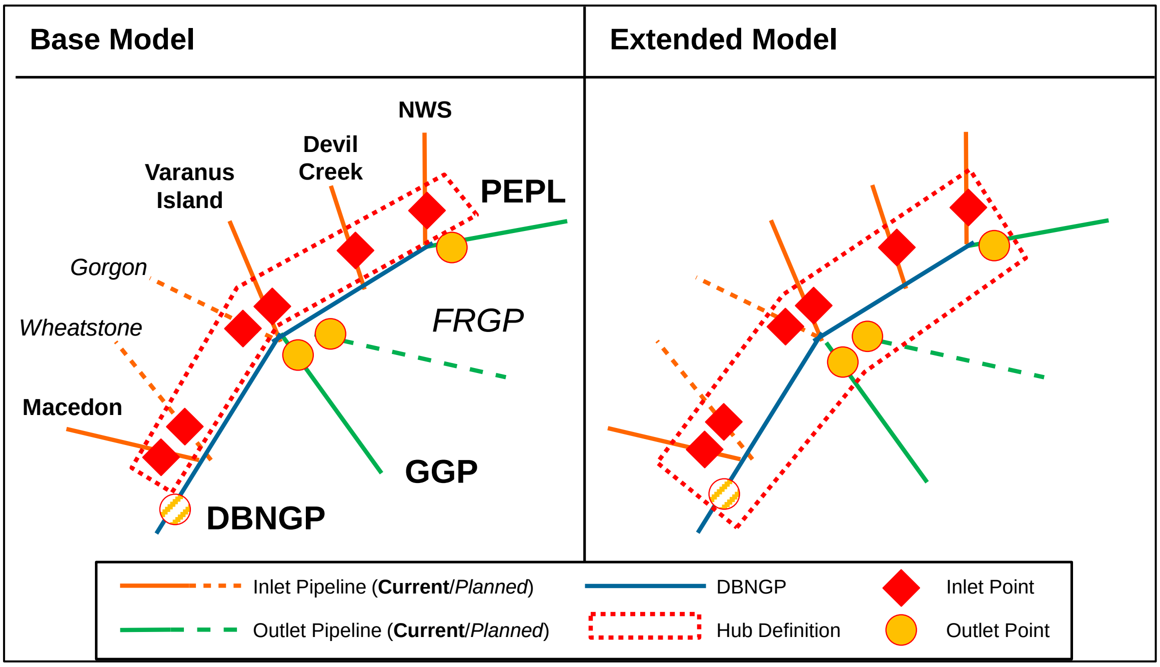
A more complex hub definition is required. Figure 1 shows two possible options, one is called the Base Model hub definition and is the simplest to implement while the other the Extended Model hub definition requires more services to support it, though would facilitate more trading opportunities. These are discussed in turn.

The Base Model hub definition groups together the inlet points from the Carnarvon Basin gas fields in the definition of the hub. This hub definition increases the potential trading liquidity of the hub by pooling together potential buyers and sellers. For this hub design to work all buyers must have the ability to receipt gas at each of the defined inlet points. This hub design allows existing balancing arrangements to be used and avoids the requirement to establish hub services[6].

It is understood from the DBNGP that, subject to contractual terms and conditions and physical limitations, shippers can reallocate MDQ between inlet points so that they can purchase gas at any of the defined inlet points on the DBNGP as shown in Figure 1. However, it should be noted that some shippers may not currently have MDQ at each of the defined inlet points and as such they would need to carry out the actions required by the DBNGP to access the defined inlet points.

Pooling inlet points in this fashion works best if shippers see no difference in transportation costs relative to those points. If transportation costs are the same from each of the inlet points, as is the case for the T1 full haul DBNGP service, then buyers should be indifferent to which inlet they transact at. However, if a buyer's transportation charge is different for receipting gas from different inlet points, as may be the case with P1 part haul or B1 backhaul services[7], then the buyer would be uncertain[8] of the value of the commodity when bidding for the product on the exchange.

Figure 1: Options for defining the Carnarvon Basin hub



The Extended Model hub definition would include all inlet and outlet points from the DBNGP in the Pilbara region. The direct participation of shippers on the PEP and the GGP could increase the level of participation and in turn trading liquidity. A significant benefit of this hub definition is that all buyers and sellers would have common access to the hub and any uncertainty associated with shipping costs would be removed.

This Extended Model hub definition would require the development of intra-hub transfer services[9] to facilitate the transfer of gas from anyone of the inlet points to anyone of the outlet points. The

[6] Rather than allow a seller at any location to be matched with a buyer at any location, the inlet point relevant to a transaction could be designated by the seller. The buyer would be informed of the relevant inlet point at the time of the transaction.

[7] The tariff for the part haul and back haul services are quoted per km in the Access Arrangement for the Dampier to Bunbury Natural Gas Pipeline.

[8] This uncertainty could be removed if the buyer accesses a pipeline service that allows gas to be transferred from any of the inlet points to any of the outlet points for a pre-determined fee.

[9] The extended hub definition is also likely to benefit from the development of services for the balancing of gas.

operation of the Extended Model hub would benefit from the netting of transactions and the coordination of gas deliveries between the connecting facilities by a hub operator. The netting of offsetting buy and sell transactions at specific locations within the hub would reduce the quantity of gas that must be physically transferred across the hub.

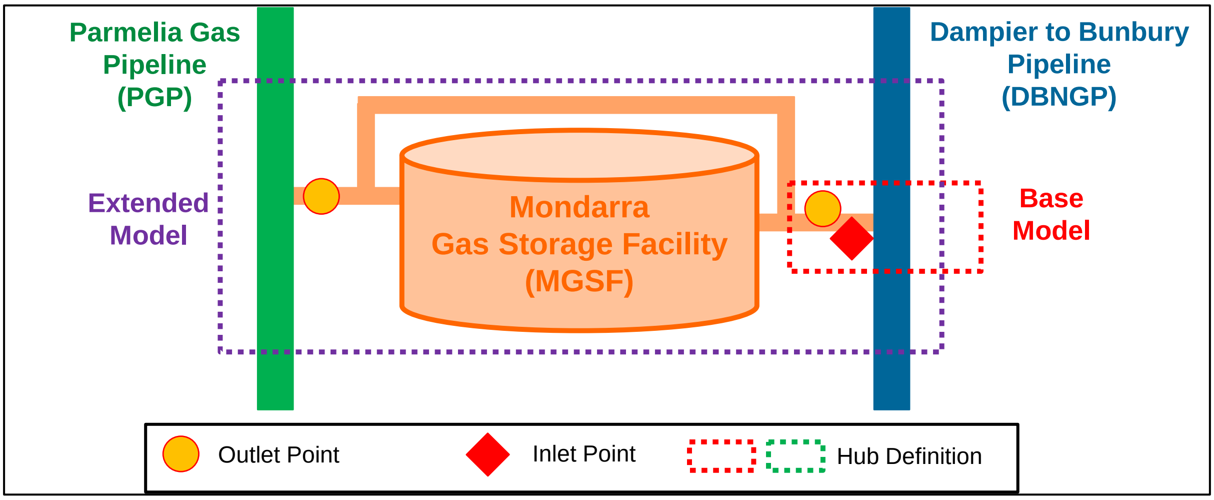
Mondarra Gas Storage Facility

The MGSF, located near Dongarra at the intersection of the DBNGP and the Parmelia Gas Pipeline (PGP), is the largest commercial storage facility in Western Australia. The MGSF has storage capacity of 15PJ with the capability to inject gas into the storage facility from the DBNGP at a rate of 70TJ/day and for gas to be withdrawn from the facility into the DBNGP or the PGP at a rate of up to 150TJ/day. Gas flowing from the DBNGP can also bypass the storage facility and flow directly into the PGP. The development of the storage facility was underpinned by a long term contract with a foundation customer.

Stakeholders commented that Mondarra is not currently a common location for the trading of gas and some questioned the creation of a hub at this location. The definition of the hub has been explored, though, as given the injection and withdrawal capability and the connectivity of the MGSF, a hub at this location could provide a valuable product for meeting the balancing and short-term gas trading requirements of participants.

For the Mondarra hub we again describe a “Base Model” and an “Extended Model” hub definition as shown in Figure 2. The Base Model hub definition for Mondarra is the connection point between the DBNGP and the MGSF. This hub definition has the potential to pool together potential buyers and sellers on both the DBNGP and the MGSF. Gas flows at this location are bi-directional and it is understood that the flows into and out[10] of the storage facility are allocated separately. To facilitate the potential transactions at this location there may need to be some change to the existing allocations agreements or the creation of a notional allocation point.

Figure 2: Options for defining the Mondarra hub



The hub definition could be extended to include the connection point to the PGP. This hub definition could increase trading liquidity through the direct participation of shippers on the PGP. This extended hub definition would require an intra-hub transfer service to ensure that transactions between shippers on the connecting facilities can be delivered. The operation of the Extended Model hub would benefit from the netting[11] of transactions and the coordination of gas deliveries between the connecting facilities by a hub operator.

[10] Inlet and outlet points in Figure 2 are with respect to the MGSF.
[11] It is understood that nominations for injections and withdrawals at MGSF are netted as part of current operations.

As an alternative to the Extended Model, if shippers on the PGP could contract for a service to transfer gas from the MGSF-DBNGP connection point (Base Model hub definition) into the PGP then it may be possible to achieve a similar level of liquidity with the Base Model hub definition.

4.5. Gas Balancing Arrangement

A balancing service at a hub would correct for any under or over delivery to ensure that a transaction is delivered in full to the buyer. The development of balancing services for the market would increase the reliability of gas delivery for trading participants and would simplify the settlement and prudential model as the market would not require a mechanism for settling delivery variations.

While not applicable to the proposed gas trading hubs, a balancing arrangement operates within the retail gas market. The swing shipper service is a balancing arrangement managed by the Retail Energy Market Operator (REMCo) that applies only to the Metro North sub-network of Mid-West and South-West Gas Distribution System. It is understood that an Operational Balancing Agreement (OBA) exists at the inlet point from some of the Carnarvon Basin gas fields.

A balancing service could be procured and maintained by the facility operator or balancing could be provided by shippers through a competitive market mechanism. However, there would be costs and contractual changes required to implement and maintain a balancing service for the market. In keeping with the guiding principles, a balancing service is not proposed for the market. Instead trading participants will utilise their existing contracts for gas supply and balancing and the market will require a mechanism for settling gas delivery imbalances.

Further consideration should be given to the balancing requirements of the market if it is decided to extend the definition of the proposed hubs.

4.6. Products

The gas market would trade “products”. Standardised products can be traded through an exchange platform operated by the market operator while less standard products could be traded bilaterally with the market operator providing a matching service. The exchange traded products for physical gas delivery to a hub, covering spot and short-term delivery periods, will need to be defined including requirements for gas specification and pressure, gas quantities and gas delivery requirements.

Additional products for the trading of gas in a facility could also be developed for the market. Such products could be based on the imbalance trading mechanism on the DBNGP or the in-ground transfer service on the MGSF. These products are based on a “balanced” transfer of gas and as such would be simple to trade and settle. However, only a subset of the potential trading participants are likely to be able to trade these products as they require a contract for the specific transfer service with the relevant facility operator. These products could be offered without impacting the high level design and should be considered further by industry as part of any future discussion of the specific products to be traded.

Some stakeholders expressed an interest in the development of forward products. The trading of forwarded products could be accommodated within the proposed trading mechanism. However, the prudential approach proposed as part of the base model design (see section 4.10) would result in relatively high credit support requirements when applied to forward products. The efficient management of credit support requirements for forward transactions is to employ the processes of a clearing house using initial and variation margins (based on the mark-to-market). The development of forward products, in conjunction with the prudential processes of a clearing house, is proposed as an extended model for the market.

4.7. Pipeline Capacity Trading Arrangements

The development of pipeline capacity trading arrangements is an important component of the market development for the following reasons:

- To support greater participation in the gas spot market by allowing trading participants located across WA to deliver gas to and take gas away from a trading hub or to move gas between trading hubs in situations where they may not have shipping contracts in place to facilitate this.

- An efficient and transparent trading arrangement increases the opportunity for trade and improves economic outcomes by allowing the lowest cost gas supplies to be transported to the highest value users.

We understand that DBNGP is the only pipeline currently offering a capacity trading service. A shipper seeking additional capacity for a gas day can contract directly with the DBNGP through its Spot Capacity arrangement. However, all pipelines allow the bilateral trading of pipeline capacity between shippers (bare transfer) or the trading of a delivered gas product.

Some stakeholders proposed that pipeline capacity products should also be traded through the proposed gas market. However, a challenge for trading capacity on an exchange is the standardisations of terms, including the specific receipt and delivery points. Rather than develop an exchange traded capacity product for the initial stage of the market it is proposed that services are developed to support the shipper-to-shipper trading of unused pipeline capacity. Services the market and pipeline operators could provide to enhance trading and provide value to participants include:

- *Standardisation:* Industry led development of standard terms and conditions would reduce transaction times and costs which would increase the feasibility of short term trading between shippers.
- *Matching service:* Provide a platform for potential buyers and sellers to be matched together to initiate bilateral negotiation of a pipeline capacity transaction. Once matched parties could negotiate the terms of a transaction based around the industry standard terms and conditions.
- *Settlement:* The gas market could settle transactions between the participants. Provided the participants have the necessary credit support, transactions[12] could be registered with the market for settlement as part of the regular billing of gas commodity transactions.
- *Pipeline operator transfer services:* Transactions facilitated through the bare transfer of capacity between shippers can increase operational risks for the parties. As nominations and allocations are all via the contract holding shipping, the purchaser must reveal information about their gas trading activity that may prefer, and would otherwise, remain confidential. Services that allow direct operational interaction between the pipeline operator and the buyer should be developed.

Standardisation and regular trading of secondary pipeline capacity could provide a base for the future development of exchange traded pipeline capacity. In particular, the development of multiple hubs on the DBNGP could provide the necessary standardisation for a pipeline capacity product to be developed for between-hub transportation[13].

4.8. Trading Mechanism

To support the support the wholesale trading of gas the market requires standard trading terms and a platform for participants to place orders and for those orders to be matched to form transactions.

Auction vs continuous matching

Auction matching is the periodic, for instance once a day, matching of buy and sell orders to form transactions at a common clearing price. Continuous matching, by contrast, matches an offer to sell a set quantity with a bid to buy that same quantity with an offer (or bid) remaining active until it can be matched.

A continuous matching approach is proposed for the market because transactions can be formed at any time within the opening hours of the market providing greater ability for participants to transact in response to changing demand or supply requirements compared to a periodic auction. However, the longer the opening hours of the exchange the more resources that must be deployed by the market

[12] The settlement of the face value of a transaction could be relatively straight forward item for the market to settle. However, it should be noted that a requirement to settle additional items, for example imbalance charges, would increase the complexity of this service provision.
[13] An alternative product is a gas swap between the two hub locations.

operator and trading participants. Further consideration of the opening hours of the market should be conducted during a detailed design phase of the market implementation.

Off-market trade facility

An off-market trade facility allows trading participants that have entered into a transaction bilaterally to register that transaction with the market for settlement. The inclusion of an off-market trade facility in the design of the gas market would allow trading participants to take advantage of the standardised product definitions and centralised settlement and prudential arrangements whilst providing the flexibility to negotiate transactions bilaterally or to engage a broker to fill their trading requirements.

The involvement of brokers in the market could enhance trading liquidity. In turn, a centrally settled gas product could be a valuable new product for brokers and their customers.

4.9. Gas Delivery

Gas Delivery Obligations

A transaction should create a firm obligation for a seller to deliver gas to the hub and for the buyer to receipt gas at the hub. If the transaction is not firm, such that the seller can fail to deliver or the buyer fails to take the gas, then this increases the cost of administering the market, puts pressure on balancing arrangements and reduces the attractiveness of trade.

An extended feature for the market would be the netting of gas delivery obligations[14] across buy and sell transactions for each specific gas day[15]. The further the gas delivery is into the future the more likely it is that a trading participant will need to adjust their original transaction positions and as such the more valuable delivery netting would be to trading participants. The netting of gas deliveries would occur just prior to the start of the delivery gas day and would require the market operator to maintain a system for matching the net buy and sell positions of trading participants.

Because delivery netting allows a trader to financially close out their transaction positions it is understood that netted products would require the market operator to be licenced or seek exemption to the financial services provisions of Chapter 7 of the Corporations Act.

Gas Delivery Mechanism

It is proposed that gas delivery is based on existing bilateral gas delivery processes. Such an approach would not require any changes to existing pipeline-shipper gas delivery arrangements and as such is consistent with the guiding principles.

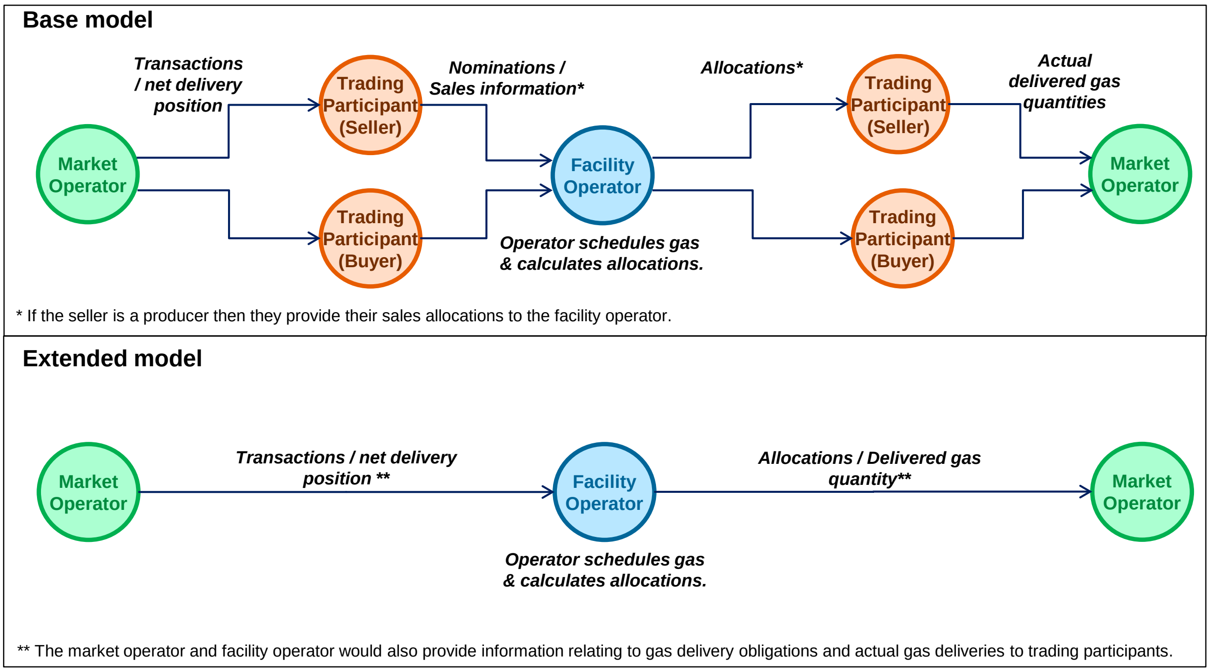
Under a bilateral gas delivery process the market operator does not have a role in the delivery of gas. As shown in Figure 3, the market operator provides information to the buyer and seller so that they can make the necessary nominations to the relevant facility operator/s to fulfil their gas delivery obligation. The facility operator would schedule and allocate gas in accordance with their pipeline contract. Trading participants would then calculate the actual delivered quantities and communicate this information to the market operator for settlement purposes.

An extended model for the market is for the facility operator to act as the counterpart to transactions. This allows the gas delivery instructions to be communicated directly from the market operator to the facility operator. The extended model would reduce administration by trading participants associated with nominations, calculating actual delivered quantities and confirming gas deliveries with the market operator. The extended model would also allow transacting parties to remain anonymous.

[14] Netting relates to gas delivery obligations only – all transactions must be financially settled.

[15] For example, a trading participant enters into a 10TJ sale transaction, later in the trading day conditions change so the trading participant enters into a 6TJ purchase transaction for the same gas day. Where gas delivery obligations are netted the trader is required only to arrange the delivery of their net 4TJ sale position.

Figure 3: Gas Delivery Mechanism



Allocations and Transfer of Title

It is understood that injections and withdrawals from the DBNGP are allocated to shippers in accordance with a Multi-shipper Agreement. Under existing Inlet Producer Sales, the producer as agent for the shippers, informs the DBNGP of the quantity of gas that has been transferred to each of the shippers at the inlet point. Shippers can transfer title of gas they receipt from a producer by registering an Inlet Shipper Sale with the DBNGP.

Allocations on the MGSF are performed in accordance with an agreement between shippers. APA Group offers a service to shippers on the MGSF that allows them to transfer title of gas in the facility to another shipper.

Gas Delivery Imbalance

Under the proposed design it will possible for gas deliveries to vary from transacted quantities and as such the market will require a mechanism[16] to:

1. Adjust settlement to reflect the actual quantity of gas delivered, and
2. Provide compensation to the non-defaulting party for any additional pipeline costs incurred as a result of the default on gas delivery obligations.

Gas Delivery Confirmation

Confirmation of the actual quantity of gas delivered will be required by the market operator for settlement purposes. As per the proposed bilateral gas delivery mechanism, trading participants will calculate the actual delivered quantities based on allocations they receive from the relevant facility operator and then provide this information to the market operator.

4.10. Settlement and Prudential

A centralised settlement and prudential model is proposed for the market. A centralised model reduces transaction costs across industry by netting payments and charges into a single invoice, reducing circular cash flows and avoids duplication of credit support facilities. The IMO could

[16] It is understood that the current convention is that in the first instance parties attempt to physically make up a variation on another gas day – this convention should be accommodated within the market arrangements.

provide this service to the market by leveraging its electricity market settlement and prudential capabilities.

Settlement

All transactions, gas delivery variations and market fees will be settled by the market operator:

- Transactions: the settlement value for all transactions is the product of the transaction price and transaction quantity.
- Gas Delivery Variation: where the buyer and seller are not otherwise able to resolve a gas delivery variation then they will be able to settle the variation through the market. This settlement item adjusts the transaction settlement to reflect the actual quantity of gas delivered.
- Market fees: Comprises a fixed participation fee as well as a variable component based on the quantity of transactions executed during the billing period.

Settlement could take place monthly around a similar time to the billing of existing gas supply and transportation agreements. Alternatively, the credit support requirements for buyers could be reduced by applying a weekly billing period with similar timelines as the Short Term Energy Market (STEM) operating in the electricity market.

An extended model for the market is to combine the settlement of the gas market with the settlement of the WEM. Combining the settlement of the gas and electricity markets could be of value to gas powered generators through the reduction of circular cash flows and the netting of credit support requirements. Further consideration should be given to the potential impacts of this proposal on the electricity market (including rule changes).

Prudential

A key driver for the gas market identified by stakeholders is the implementation of robust prudential requirements and processes.

The posting of credit support by trading participants reduces the risk of a payment default by a trading participant on the normal operation and settlement of the market. Consistent with the guiding principles all settlement risks will be collateralised by trading participants. Under this approach buyers will be required to provide credit support to meet the face value of their transactions. The market operator will regularly estimate the exposure of each trading participant and monitor these exposures against their credit support.

An extended model for the market, and one that should be considered further if forward products are developed, is to base credit support requirements on initial and variation margins (mark-to-market) as per the prudential approach applied by a clearing house.

4.11. Market Information

Trading participants will require information to assist their participation in the market. At a minimum the market should provide the following information to trading participants:

- Confirmation of order submissions so that active orders and exposures can be monitored.
- Confirmation of executed transactions so that trading positions can be monitored.
- Details required for gas delivery including counterparty, gas delivery location and quantities.
- Actual gas delivery quantities to allow imbalances to be managed and expected cash flows to be monitored.
- Invoices and settlement data to allow participants to reconcile their invoices.

The transparency of gas prices would be enhanced by publication of the price and quantity of transactions carried out through the spot market.

4.12. Legal Framework

The legal framework establishes the market and provides the legal basis for the trading of defined products. The legal framework for the market would be required to carry out the following functions:

- Establish market and enable the market operator.
- Standard terms and conditions for the trading, delivery and settlement of gas and pipeline capacity.
- Product specifications which define the commodity traded.
- Rights and obligations of trading participants.
- Monitoring and enforcing compliance with the rules.

The legal framework for the market could be structured in the form of a suite of regulatory instruments including an act, regulations, rules and procedures. An alternative legal framework applied at many international energy exchanges is to structure the market rules and product specifications in the form of a contractual agreement between the market operator and participants.

Many of the elements of the legal framework do not impact upon the market design or general workings of the market systems and processes. In particular, product specifications define the commodity traded rather than how it is traded, delivered and settled.

The IMO is governed by rules and as such some component of the legal framework would need to be contained in a rules based framework. The product specifications and the standard terms for trading, gas delivery and settlement could be rules or contract based provided that the framework allows a timely response to market developments required by trading participants.

4.13. Cost Recovery

The establishment of a market requires a trading platform, reporting and settlement system, legal documentation of the market rules and product specifications and market readiness activities.

The cost of implementing and operating the gas market should, to the extent practicable, be recovered from gas market participants recognising uncertainty in the level and growth of transaction volumes associated with a voluntary market. Sponsorship of the market by participants should be considered further as a means of providing greater financial certainty and as a commitment to the market implementation and its on-going development.

Market fees

Ideally market fees would be paid by trading participants when they participate in the market through a variable transaction fee. However, given the uncertainty of market fees associated with voluntary participation the market operator may need to charge a fixed participation fee or require some guarantee from industry or government for the recovery of its costs.

It may be appropriate to charge a fixed participation fee where market costs are, to some extent, dependent on the number of participants (for example, the licensing cost of specialised market software). However, the fixed participation fees should not be set so high as to create a barrier for small organisations to participate in the market.

Sponsorship

Sponsorship could take the form of:

- Upfront payment or commitment to the payment of participation fees by trading participants.
- Commitment by a trading participant to be a liquidity provider (market maker). A liquidity provider makes bids and or offers on the exchange to help promote transparency and liquidity.
- Commitment by facility operators to work with industry to develop services to support the development of the market.

5. High Level Design

This section presents a concise statement of two versions of the proposed high level design. Rows that are unshaded reflect the simplest design that would satisfy most of the key objectives of a market. Shaded rows reflect extended functionality that could be incorporated into the design, extending the benefits from having a gas market though with some increase to the degree of change required to implement the market. Each aspect of the design is described in the context of a specific feature and is assessed against the Guiding Principles. The views of industry, based on conversations with a cross section of GAB Members, are summarized.

Table 1: High Level Design

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Gas Trading Hubs	At least one trading hub must be defined. We propose designated trading hubs based around the inlet points from the **Carnarvon Basin** gas fields and **Mondarra - DBNGP** aligning with the inlet/outlet of the Mondarra Gas Storage Facility and the DBNGP. Each hub is defined as a specific physical location/s at which the title of gas can be transferred between trading participants.	Changes to pipeline contracts are not required with these hub definitions. *The hub definitions are a balance between the principles of maximising participation and avoiding the requirement to change to change gas pipeline arrangements (Principles 2 and 7).*	Voluntary gas trading hub. The inclusion of shippers on the Goldfields Gas Pipeline (GGP) viewed by some as beneficial to market liquidity.

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Gas Trading Hubs (extended)	Hub services are developed by industry to support the operation of the hubs. Replace **Carnarvon Basin** with **Pilbara region**: Services developed to group together inlet points and outlet points (Pilbara, Goldfields pipelines) in the definition. Hub operator nets trades and schedules gas flows across the hub to ensure transactions between buyers and sellers in different locations are delivered. Replace **Mondarra – DBNGP** with **Mondarra**: Services developed for the transfer of gas between facilities connecting to the Mondarra Storage facility. One of the facility operators takes the role of netting trades and coordinating gas deliveries at the hub.	Hub services are required under this option. The development of intra-hub services for the Pilbara region would increase the number of potential buyers and sellers that can be pooled together enhancing liquidity. The development of intra-hub transfer services between all of the facilities connecting to Mondarra could increase the number of potential buyers and sellers that can be pooled together. The coordination of gas deliveries between the market and facility operators could enhance the efficiency of operations. *The extended hub definitions maximise participation (Principle 2). However, the hub definitions conflict with the principle of avoiding the requirement to change gas pipeline arrangements (Principle 7).*	Acknowledgement of the benefits of a hub incorporating all inlet and outlet points in the Pilbara regions. Some of the view that a Pilbara region hub should be proposed as the base model for the market.
Gas Balancing Arrangements	No mandated balancing service for the gas trading hubs. Instead, balancing will be in accordance with existing pipeline contracts and any variation between a transaction and the actual flow will be settled (physically or financially) between trading participants.	While the establishment of balancing services would increase the reliability of deliveries there is likely to be considerable costs associated with the implementation and on-going operation of these arrangements. *The proposal avoids the requirement to change gas pipeline arrangements (Principle 7).*	Strong view that a new balancing service should not be included in the base model for the market.

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Participation Requirements	Voluntary participation in the market. Trading participants must be able to deliver or receipt gas at the hub. To participate in the market trading participants must have the right to deliver gas to the hub or be a shipper on the relevant facilities. Trading participants must be able to provide credit support in an acceptable form to cover the exposure associated with their transactions.	The simple design and physical nature of products means that participants must have existing pipeline contracts. *The proposed market is accessible to wholesale gas market participants and ensures that settlement risks are collateralised (Principles 2 and 6).*	Strong view that participation should be voluntary.
Trading Mechanism	An independent market operator operates an exchange for the wholesale trading of gas products. Orders in designated products matched continuously throughout the opening hours of the market to form transactions. An off-market trade facility allows bilateral transactions to be registered with the market for settlement.	Providing there is sufficient liquidity, the proposed trading mechanism allows transactions to be formed in a fast and transparent manner in response to changing market conditions. *The mechanism allows competition between buyers and sellers, reduces transaction costs, provides anonymity of orders and is independently operated. (Principles 1, 3, 5 and 9).*	Preference for continuous matching rather than an auction.
Products	Gas commodity products listed on the exchange for trading. Products are for physical gas delivery at a hub and for spot and short-term forward delivery periods. No "exchange traded" capacity products.	Capacity products are not included in the basic model because further development work would be required to define a homogenous product that is compatible to trading on an exchange – that is there are many potential sellers and buyers. *The products are accessible to wholesale gas market participants, simple to trade and minimise transaction costs. (Principles 2 and 3)*	Interest in spot products and some interest in week-ahead and month-ahead products.

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Products (extended)	Develop medium-term forward products (e.g. from a few months out) in conjunction with a clearing house. Develop exchange traded pipeline capacity products.	*Forward products and capacity products would be developed to meet the evolving needs of trading participants. Supporting arrangements would minimise transaction costs. (Principles 2 and 3)*	Some interest in forward products including monthly and quarterly products. Some interest in pipeline capacity products traded through the exchange.
Pipeline Capacity Trading Arrangements	Develop standard terms and conditions for secondary trading of pipeline capacity. Market operator provides a platform for matching buyers and sellers of unused pipeline capacity. (i.e. not exchange traded products)	*Development increases participation in the gas market, reduces transaction costs and avoids change to gas pipeline arrangements. (Principles 2, 3, and 7)*	
Orders (bids & offers)	Trading participants submit orders in a specific product to the market operator.	*Efficient and transparent process. (Principles 1 and 3)*	
Transactions	The matching engine for exchange traded products pairs buy and sell orders together to form transactions in designated products. The exchange operates in a mode of continuous matching trading during the opening hours of the market. The matching of orders to form transactions occurs continuously throughout the opening hours of the market. The exchange will allow off-market transactions (in products listed on the exchange) to be registered for settlement.	Transactions can be executed, subject to there being sufficient liquidity, by trading participants when required. *The mechanism is efficient, transparent and cost effective and minimises transaction costs. (Principles 1, 3 and 5).*	

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Gas Delivery Obligations.	The seller must deliver gas and buyer must receipt gas for each individual transaction on a firm basis without netting transactions.	The netting of gas delivery obligations is not proposed for the base model because it would require additional systems and financial services licensing[17]. *The proposal is simple and cost effective to implement. (Principles 2 and 8)*	Strong view that transactions should be firm. No view on netting. The process for managing default on gas delivery that is not caused by a seller should be considered further.
Gas Delivery Obligation (extended)	Seller must deliver and buyer must receipt their ***net gas delivery*** position. Net gas delivery obligations across offsetting buy and sell transactions in the same product (hub) and delivery gas day.	The longer the period between a transaction and the delivery period (as for forward products) the more likely it is that a trading participant will enter into offsetting buy and sell transactions to manage their gas position for a particular gas day. The listing of medium-term forward products should be accompanied by the netting of gas delivery obligations. *The extended proposal would minimise transaction costs. (Principle 3)*	

[17] It is understood that the trading of a "netted" product would require the market operator to be licensed or to seek an exemption to licensing to the financial services provisions of the Chapter 7 of the Corporations Act.

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Gas Delivery Mechanism	Bilateral gas delivery. Transaction details reported to the buyer and the seller so that they can organise the delivery of gas in accordance with their existing contractual arrangements with the relevant facility operator/s. Buyer (and or seller) makes nominations to the relevant facility operator/s for the delivery of gas in accordance with their transaction obligations.	The facilitation of gas deliveries between the market operator and the relevant facility operators would require amended pipeline contracts as well as a new systems interface. As such, a bilateral model where there is no requirement to change existing contracts is proposed for the basic model. *This proposal avoids change to gas pipeline arrangements and is consistent with existing trading conventions. (Principles 7 and 8)*	Strong support for a bilateral gas delivery mechanism.
Gas Delivery Mechanism (extended)	The market operator communicates transactions or net deliveries directly to the relevant facility operator/s on behalf of the trading participants.	The extended model provides a more efficient process and allows trading counterparts to remain confidential. The establishment of trading liquidity should provide a justification to develop the systems and amended contracts to support the implementation of the extended gas delivery mechanism. *This extended proposal minimises transaction costs and allows counterparts to remain anonymous throughout the gas delivery process. (Principles 3 and 5)* *However, changes to pipeline contracts would be required. (Principle 7)*	Acknowledgement of potential benefits of the extended gas delivery mechanism.
Gas Scheduling	Facility operator/s schedules gas flows in accordance with nominations and existing contracts.	As per existing arrangements.	

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Allocations	Facility operator allocates gas deliveries in accordance with their existing shipper agreement/s. Trading participants calculate the actual delivered quantity of gas for each of their transactions based on information provided to them by the Facility operator/s.	As per existing arrangements.	
Gas Delivery Confirmation	Trading participants provide and confirm actual gas delivery information with the market operator for settlement purposes.	As per the proposed bilateral gas delivery mechanism, delivery confirmation should be performed by trading participants so that there is no requirement to amend contracts or implement new systems. *This proposal avoids change to gas pipeline arrangements and is consistent with existing trading conventions. (Principles 7 and 8)*	
Gas Delivery Confirmation (extended)	Facility operators provide actual gas delivery information to the market operator for settlement purposes.	The timely provision of actual gas delivery information will provide more certainty of settlement outcomes and reduce credit support requirements. The establishment of trading liquidity should provide the justification to develop the systems and amended contracts required to support the implementation of the extended gas delivery confirmation. *This extended proposal minimises transaction costs. (Principle 3).* *However, changes to pipeline contracts would be required. (Principle 7)*	Acknowledgement of the potential benefits of extending the design of the market to include the confirmation of gas deliveries by the facility operator.

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Settlement & Prudential Model	The market operator centrally settles transactions with trading participants. Trading participants must provide credit support to the market operator to cover their potential settlement exposure on delivered transactions, transaction not yet due for delivery and active orders.	Centralised settlement of the market reduces transaction costs The IMO has settlement and prudential staff, systems and processes for the WEM. If the IMO is the market operator then these capabilities could be used to develop a robust and efficient settlement mechanism for the gas market. *Proposal minimises transaction costs. (Principle 3)*	Mixed views on whether a centralised or bilateral settlement approach should be employed. Some of the view that a robust prudential approach is required. Strong view that, at least initially, the gas market should be settled separately from the WEM.
Settlement & Prudential Model (extended)	The market operator centrally settles gas transactions with trading participants. Aggregate settlement and exposures across the WEM and the gas market.	The netting of settlement amounts between the gas and electricity market will reduce circular cash flows and credit support requirements of participants operating in the gas and electricity markets. For example, a gas powered generator could offset amounts owed to it in the WEM against amounts it owes for purchases in the gas market. *This extended proposal minimises transaction costs whilst maintaining full collateralisation of settlement risks. (Principles 3 and 6).*	View was that initial implementation should be separate from WEM
Settlement & Prudential Model (extended)	Apply the prudential processes of a clearing house to transactions in medium-term forward products.	The trading of medium to long term forward products should be accompanied by the more efficient risk management processes of a clearing house (mark-to-market). It is understood that a clearing license is required provide these services to the market. *This extended proposal minimises transaction costs and ensures that settlement risks are collateralized efficiently. (Principles 3 and 6).*	

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Market Information	Trading participants will receive reports containing information on their participation in the market including; confirmation of order submission and the execution of transactions, details required to fulfil their gas delivery obligations, actual gas delivery quantities, invoices and settlement supporting data. Publish transaction prices and quantities.	Provide trading participants with information they require to participate efficiently in the market. The publication of market statistic will increase price transparency. *The proposal enhances the transparency of gas prices. (Principle 4).*	
Legal Framework	The enabling of the market and the high level market framework are set out in a rules based framework. Product specifications and standard terms for trading, gas delivery and settlement are set out in rules and a subservient document. A stakeholder group is established to provide advice on the market implementation and development.	Balance between providing appropriate *The proposal provides a framework for independent governance of trading arrangements. (Principle 9)*	Market development should be industry led but an independent operator is required.
Market Fees	Ideally the market will be funded through variable transaction fees. Funding of the market may also take the form of sponsorship, fixed participant fees or a guarantee from industry or government.	*Proposal is consistent with the cost recovery principle. (Principle 11)*	Support for fixed and variable charging, cost recovery from participants.