MARKET REFORM

High Level Design for a Gas Market in Western Australia

GAB Presentation

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20 May 2014

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Introduction

- Develop a high level design for a gas spot market in Western Australia.
- The high level design will provide a basis for further consideration of a gas market by the GAB, assess impacts and estimate costs.
- Market Reform and the IMO conducted interviews with a selection GAB members and industry stakeholders to assist in setting the guiding principles and the preparation of the high level design.

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Guiding Principles

#	Principle	Description
1	**Facilitate competition between buyers and sellers**	• Competition between potential buyers and sellers of gas and pipeline capacity. • Efficient and cost effective trading mechanism.
2	**Maximise participation**	• Voluntary participation. • Accessible to as many participants as possible. • Meet the needs of potential trading participants.
3	**Minimise transaction times and costs**	• Trading arrangements should be simple and efficient. • Minimise the total transaction times and costs to participants.
4	**Enhance transparency**	• Publish transaction prices and traded quantities.
5	**Anonymous trading**	• Identity of participants to remain confidential except where 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.

Guiding Principles

#	Principle	Description
7	**Avoid the requirement to change gas pipeline arrangements**	• The gas market should not obligate changes to existing pipeline scheduling and commercial arrangements.
8	**Maximise consistency with existing shipper / producer trading conventions / processes**	• The gas market conventions and processes should be consistent with those already established in Western Australia.
9	**Independent governance of trading arrangements**	• Level playing field for trading participants. • Confidence in market outcomes.
10	**Minimise system impacts on participants**	• Data conventions should be consistent with existing participant systems used for similar functions in Western Australia and elsewhere in Australia.
11	**Cost recovery**	• Recover the cost of the market from participants. • Simple, efficient and cost effective mechanism for recovery.

High Level Design
Market Model

- Options considered:
  - *Gas trading hub:* wholesale trading of natural gas.
  - *Demand hub:* allows gas users and shippers to trade at the intersection of the transmission and distribution network.
  - *Market carriage model:* market scheduling of injections and withdrawals.
- A physical *gas trading hub* is proposed for WA due to:
  - 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 minimises the impact on existing contractual arrangements.

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High Level Design
Participation

- Voluntary participation.
- Trading Participants must have capability to deliver gas to the hub or to receipt gas from the hub.
- Market Operator
  - register participants, implement and operate a trading platform, settle transactions, monitor settlement exposures and hold credit support.
- Facility Operator
  - Do not need to participate in the base model of the market.
  - Schedule and allocate gas deliveries in accordance with existing contracts.
  - In the extended model, facility operators streamline the gas delivery processes including nominations and the confirmation of gas deliveries.

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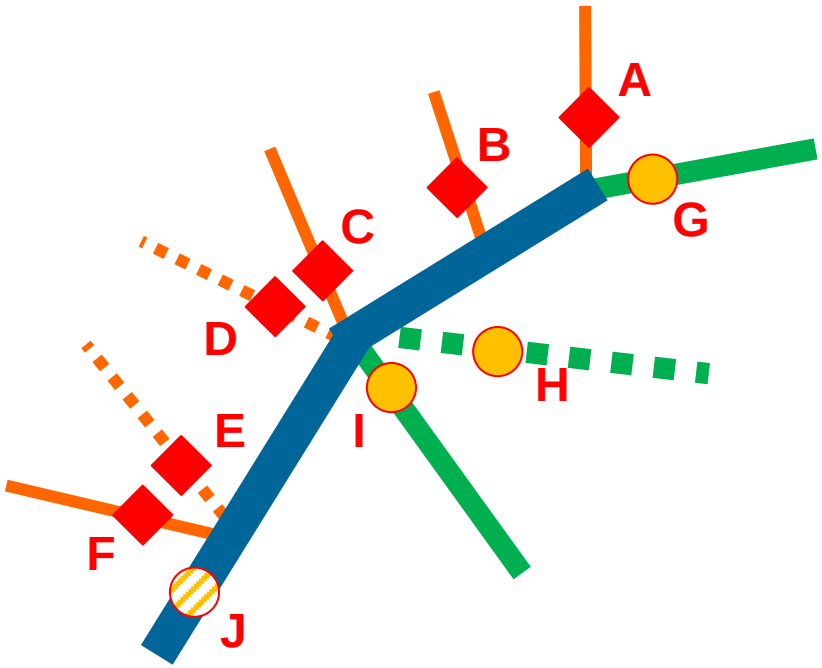
High Level Design
Gas Trading Hubs

- Key gas trading hub design decisions:
  - *Gas balancing arrangements*
  - *Delivery obligations:* Individual v Delivery Netting
  - *Gas delivery mechanism:* Bilateral v Facility Operator
  - *Delivery confirmation:* Trading Participant v Facility Operator
  - *Settlement and Prudential:* Bilateral v Centralised
- Base Model / Extended Model:
  - Under the ***Base Model*** design the gas trading hubs will overlay existing contract carriage arrangements for supply, balancing and transportation.
  - The ***Extended Model*** provides greater benefits but with higher implementation cost as well as contractual and operational changes.
- Establish at least one gas trading hub based at the ***Carnarvon Basin*** gas fields and the ***Mondarra*** Gas Storage Facility.

High Level Design
Carnarvon Basin Hub Characteristics



Inlet/Outlet	Processing Facility/Gas Pipeline
Inlets:	
A	Karratha Gas Plant (NWS JV)
B	Devil Creek (Apache)
C	Varanus Island (Apache)
D	*Planned: Gorgon LNG (Chevron)*
E	*Planned: Wheatstone LNG (Chevron)*
F	Macedon (BHPB)
Outlets:	
G	Pilbara Energy Pipeline (APA)
H	*Planned: Fortescue River Gas Pipeline (FRGP JV)*
I	Goldfields Gas Pipeline (APA)
J	Dampier to Bunbury Natural Gas Pipeline (DBP)

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High Level Design
Carnarvon Basin Hub Definition Options

- Options for the definition of the ***Carnarvon Basin*** hub:
  - Select single physical point: a major inlet point or CS1 on the DBNGP.
  - Group inlet points from gas fields - **Base** definition.
  - Group all inlet and outlet points in the Pilbara region - **Extended** definition.
- ***Base*** Hub Definition – ***Carnarvon Basin***
  - Group together inlet points from the Carnarvon Basin gas fields
  - Requires buyers to be able to receipt gas at each of the inlet points.
  - Potential issue for buyers if shipping costs are different for each of the inlet points.
- ***Extended*** Hub Definition – ***Pilbara region***
  - Requires intra-hub transfer service
  - Value in balancing service for the hub
  - Value in hub operations – netting trades, coordinating deliveries.

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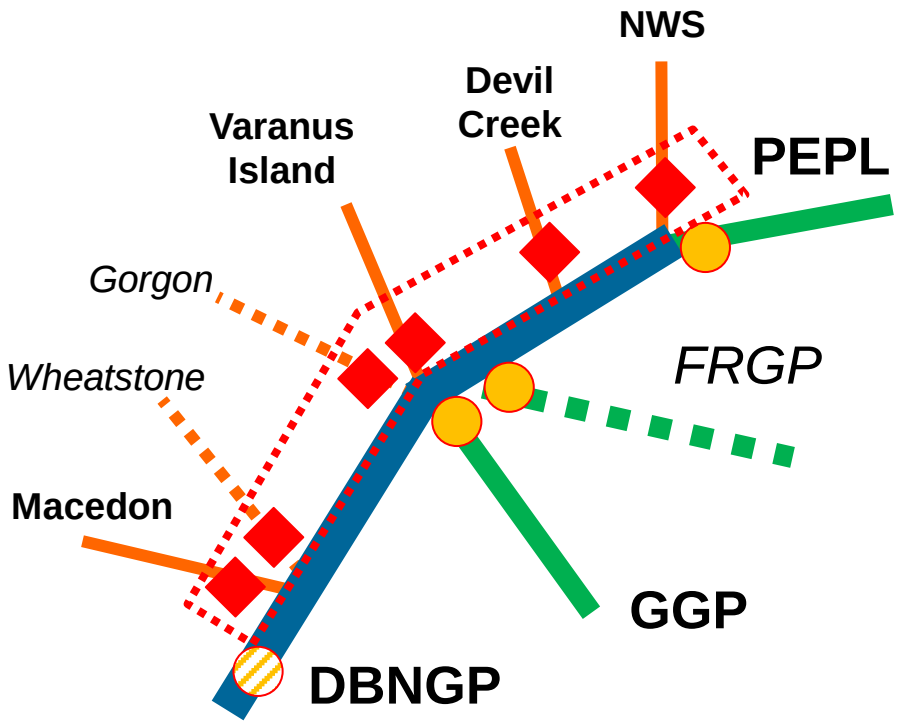
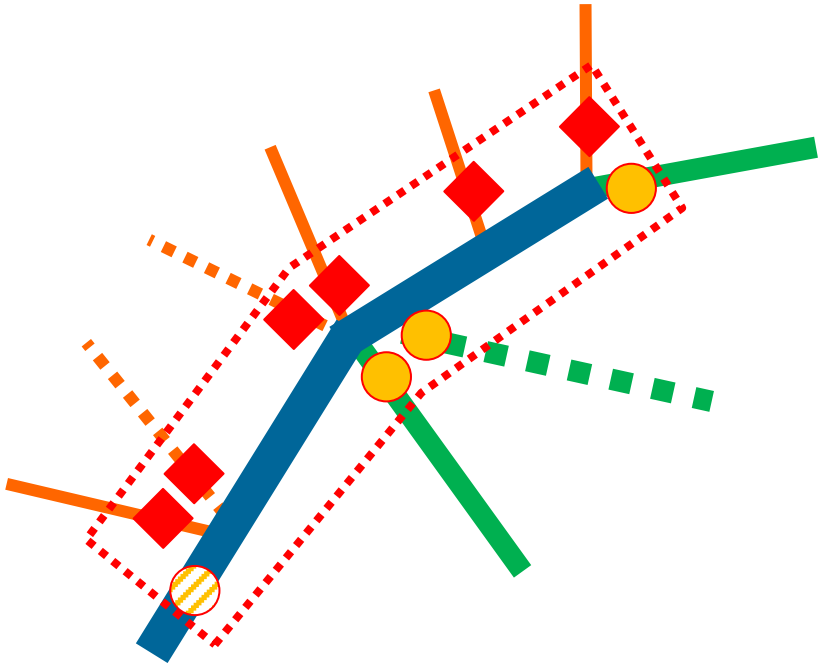
High Level Design
Carnarvon Basin - Hub Diagrams

Base Model



Extended Model



Inlet Pipeline (**Current**/*Planned*)
Outlet Pipeline (**Current**/*Planned*)
DBNGP
Hub Definition
Inlet Point
Outlet Point

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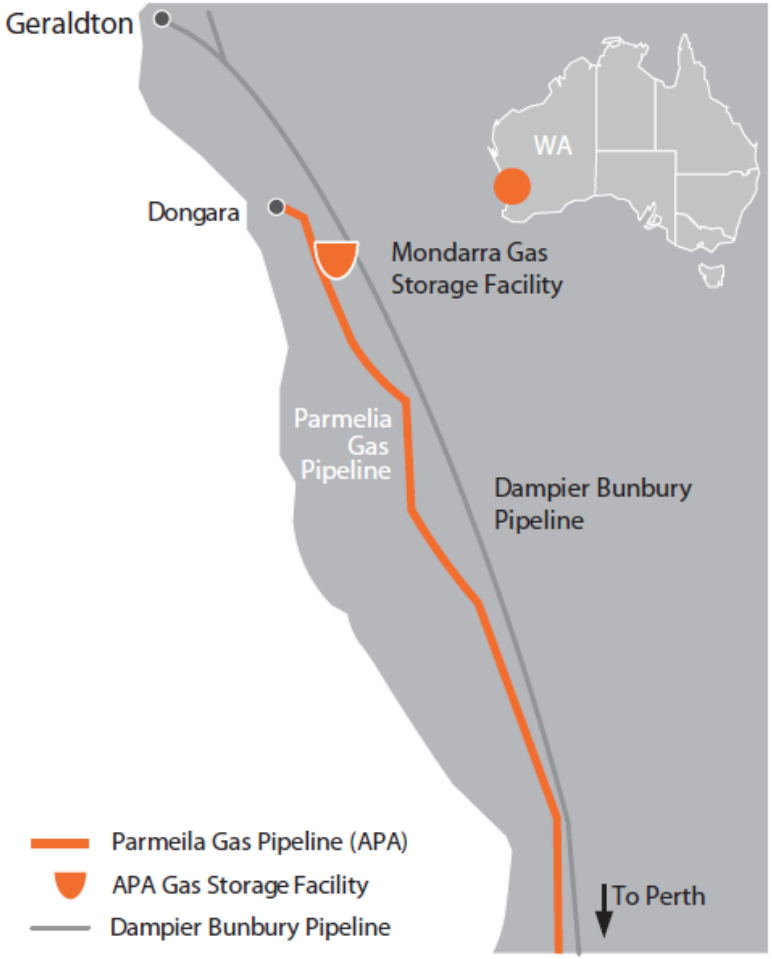
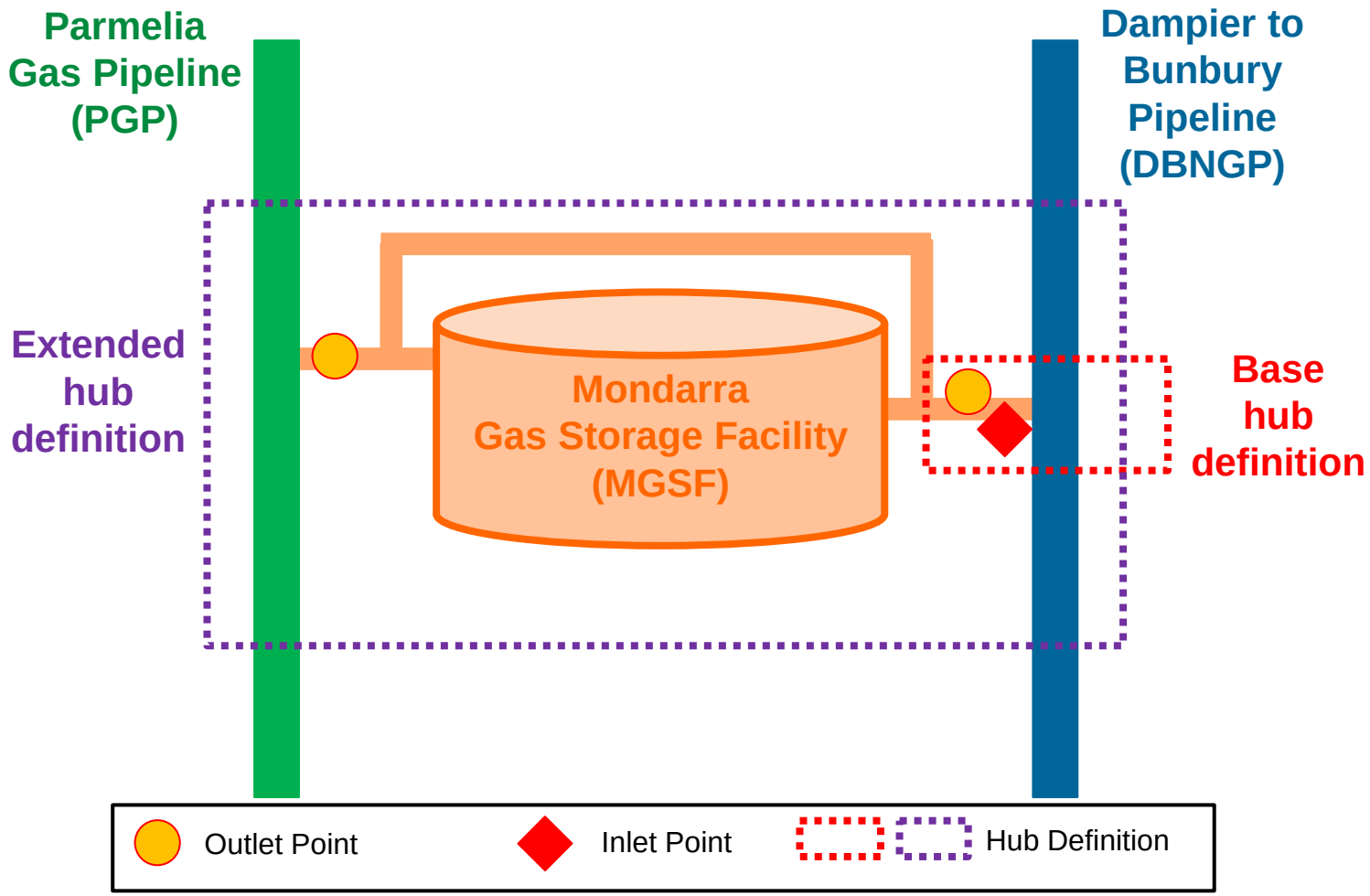
High Level Design
Mondarra Gas Storage Facility



Source: APA Group

- Mondarra Gas Storage Facility
  - Located at intersection of DBNGP and PGP.
  - 15PJ storage.
  - 150TJ/d withdrawal into the DBNGP or PGP.
  - 70TJ/d injection from DBNGP.
- Base Model: DBNGP ↔ MGSF
  - Facilitate sales and purchases by shippers on the DBNGP and MGSF.
  - May require some change to allocation agreements.
- Extended Model: all connecting facilities
  - Requires intra-hub transfer service
  - May be limited value over the base model definition.
- Hub operations
  - Value in hub operations – netting trades, coordinating deliveries.

High Level Design
Mondarra - Hub Diagram



High Level Design
Gas Balancing Arrangement

- Gas balancing service corrects for any under or over delivery to ensure that a transaction is delivered in full to the buyer.
- Balancing could be procured and maintained by facility operator or could be supplied by shippers through a competitive market.
  - ***Pros*****:** Increases reliability of delivery, removes requirement for imbalance mechanism.
  - ***Cons*****:** Cost to implement and operate balancing arrangement.
- Balancing arrangements (OBA) exist at some inlet points to the DBNGP and supply point injections are understood to be close (<5%) to scheduled flows.

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Gas Balancing	Overlay existing balancing arrangements	Avoids need to change supply and transportation contracts.	Utilise existing balancing.

High Level Design
Products

- Products for physical gas delivery at a hub.
- Requires all standard terms for trading, delivery and settlement.
- What delivery periods should be supported by the market?
  - Spot (*on-the-day, day-ahead*) and short-term forward (*day, week*)
  - Forward products (*month*) would require a more sophisticated prudential approach.
- Challenge associated with exchange trading of pipeline capacity products.
  - Requires high degree of standardisation.

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Products	Spot and short-term forward gas commodity products.	Allows relatively simple prudential approach.	Interest in spot products, week-ahead and month-ahead products.
Products (extended)	Medium to long term forward products	Requires more sophisticated prudential approach	Some interest in forward products including monthly and quarterly products.
Products (extended)	Pipeline Capacity “exchange traded”	Requires high degree of standardisation.	Some interest in pipeline capacity products traded through the exchange.

High Level Design
Pipeline Capacity Trading

- Provision of short-term pipeline services by facility operators and the facilitation of secondary trading of pipeline services.
- Services provided to participants:
  - ***Standardisation:*** industry specification of terms for secondary trading of capacity would reduce transaction times and costs.
  - ***Matching service:*** Provide a platform for matching of potential buyers and sellers of unused pipeline capacity.
  - ***Settlement:*** The gas market could settle transactions between the participants.
  - ***Pipeline operator transfer services:*** Allow direct operational interaction between the pipeline operator and the buyer – improve efficiency of secondary trading.

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High Level Design
Trading Mechanism

- Exchange for wholesale trading of gas products
  - Platform for lodging anonymous buy and sell orders.
  - Matching engine forms transactions.
  - Orders matched continuously during the opening hours of the market.
  - Allow off-market trades to be registered for settlement through the market.

	Bid		Offer	
	Qty (GJ)	Price ($/GJ)	Price ($/GJ)	Qty (GJ)
Gas Day 21 May	*2,000*	*5.50*	*5.50*	*4,000*
	3,800	4.80	5.70	1,500
	8,500	4.75	6.50	3,200

Transaction formed: 2,000GJ at $5.50/GJ.

- Establish a platform for matching buyers and sellers of unused pipeline capacity.

High Level Design
Gas Delivery Obligation

- Gas delivery obligation:
  - Transactions will create a firm obligation to deliver gas.
  - Obligations could be linked to each ***individual contract*** or ***netted*** across transactions.
  - ***Netting*** reduces administration associated with the gas delivery process.
  - ***Netting example:*** 10TJ sale + 6TJ purchase -> Deliver 4TJ

Market Feature	Proposed High Level Design	Reason and Assessment Against Principles	Industry Views
Gas Delivery Obligation	Individual contract	Avoids additional systems & licensing requirements	Transactions should be firm
Gas Delivery Obligation (extended)	Netted delivery obligations	Reduces administration for traders.	No view on netting.

High Level Design
Gas Delivery Mechanism

- Process from transaction through to the scheduling of gas and the confirmation of gas deliveries.
- Delivery counterpart: Bilateral vs Facility Operator
- Bilateral process:
  - Trading participants are responsible for arranging the delivery of gas in accordance with their contracts.
  - Trading participants calculate actual deliveries based on allocations.
  - Trading participants confirm deliveries with the market operator for settlement purposes.
  - Bilateral process does require any changes to contracts.
- The Facility Operator option streamlines the gas delivery process and allows transaction counterparts to remain confidential.

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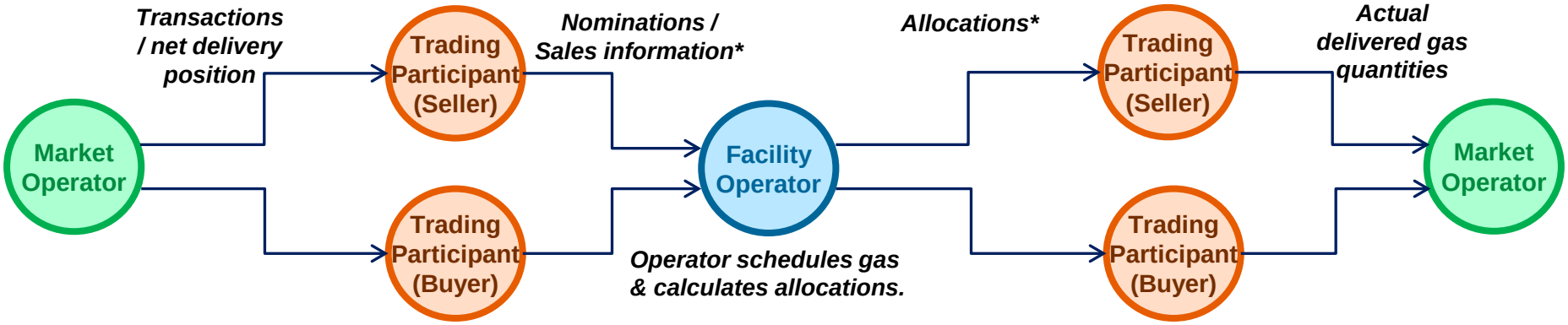
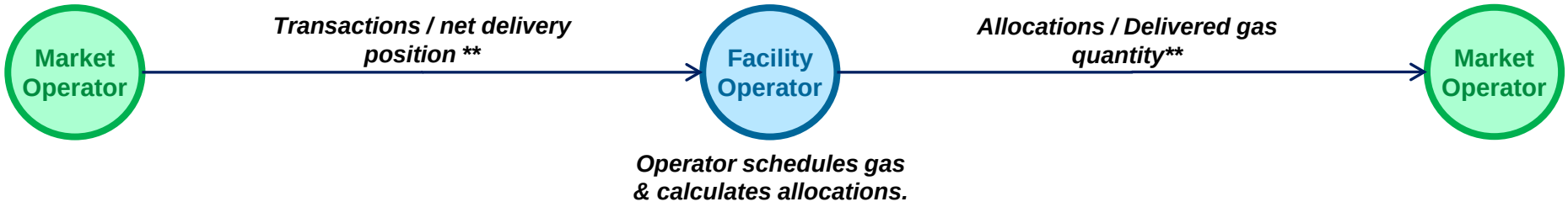
High Level Design
Gas Delivery Mechanism – Diagrams

Base model



* If the seller is a producer then they provide their sales allocations to the facility operator.

Extended model



** The market operator and facility operator would also provide information relating to gas delivery obligations and actual gas deliveries to trading participants.

Settlement and prudential model.

- Centralised model provides single invoice, reduces circular cash flow and avoids duplication of credit support.
- IMO could leverage WEM capabilities for the gas market.

Settlement

- Settlement items:
  - ***Transactions:*** Product of transaction price and quantity.
  - ***Delivery Variations:*** Correct settlement for under or over delivery. Should also allow compensation for direct costs.
  - ***Market fees:*** fixed participation and variable transaction fees.
- Billing could occur weekly or monthly as per WEM / STEM schedule.

High Level Design
Settlement and Prudential

Prudential

- Market operator regularly estimates and monitors exposure.
- Trading participants must provide collateral to the market operator to cover their exposure.
  - For buyers, requirements would be 100% of the face value of transactions.
- Collateral must be in a form acceptable to the market operator.
  - The standard in the WEM is a guarantee provided by an entity that is supervised by APRA or a government treasury with A-1 credit rating or a cash deposit.

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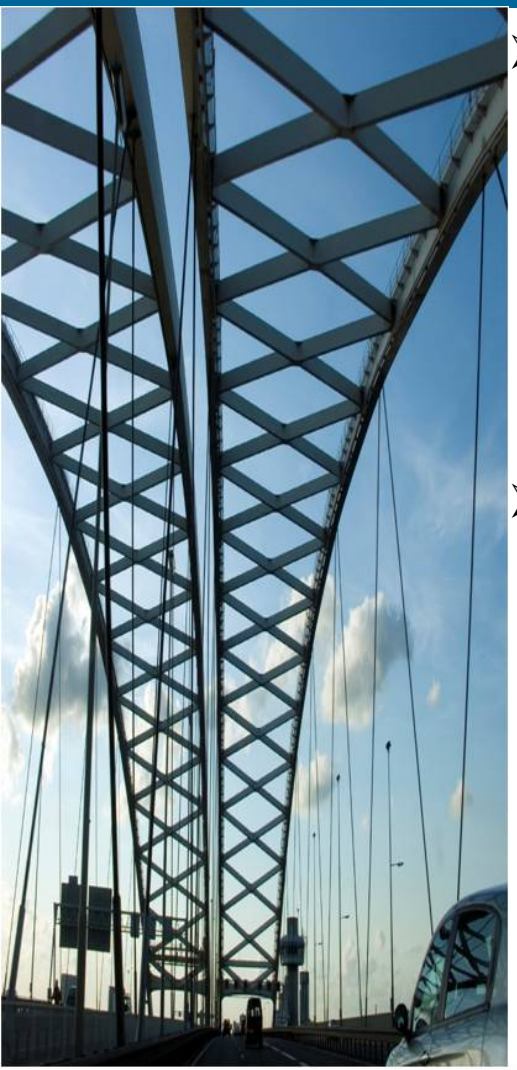
High Level Design
Settlement and Prudential – Extended model



- Combine settlement of gas market with the WEM.
  - Reduce circular cash flows.
  - Net collateral requirements across gas and electricity markets. For example, GPG could use amounts owed to it in the WEM against amounts it owes in the gas market.
- To support trading of ***forward products*** the collateral requirements would be determined based on ***clearing house*** approach.
  - Initial and variation margins.
  - More efficient use of collateral.

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High Level Design
Market Information

- Market statistics
  - Transaction prices and quantities to be made available to the public to enhance the transparency of gas prices.
- Trading participant information:
  - Confirmation of order submissions
  - Confirmation of transactions.
  - Details required for gas delivery including counterparty, gas delivery location and quantities.
  - Actual gas delivery quantities.
  - Invoices and settlement supporting data.

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High Level Design
Legal Framework

- Legal framework:
  - Establish market and empower the market operator.
  - Standard terms for trading, delivery and settlement,
  - Product specifications.
  - Participation rights and obligations.
- Options for establishing the legal framework:
  - Suite of regulatory instruments including an Act, Regulations and Rules.
  - Contractual agreement between operator and participants.
- The legal framework should allow the market to be responsive to evolving participant requirements.
  - Given the governance of the IMO at least some components of the framework would be rules based.

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High Level Design
Funding the Market

- Market establishment costs include; trading platform, reporting and settlement system, legal framework and market readiness activities.
- Sponsorship of the market by participants should be considered further:
  - Upfront payment or commitment to payment of market fees.
  - Commitment by a trading participant to be a liquidity provider (market maker).
  - Commitment by facility operators and trading participants to develop services to support the development of the market.
- Ideally market fees will be based on participation through a variable transaction fee.
  - Funding of the market may also require a fixed participation fee, guarantee from industry or government for the recovery of costs.

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Summary
Guiding Principles

1. Facilitate competition between buyers and sellers

2. Maximise participation

3. Minimise transaction times and costs

4. Enhance transparency

5. Anonymous trading

6. Full collateralisation of settlement risks

7. Avoid the requirement to change gas pipeline arrangements

8. Maximise consistency with existing shipper / producer trading conventions / processes

9. Independent governance of trading arrangements

10. Minimise system impacts on participants

11. Cost recovery based on participation

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Summary
High Level Design

Market Feature	High Level Design (Base)
Participation	Voluntary participation, trading participants must be able to physically receipt or deliver gas.
Gas Trading Hubs	At least one hub developed based around the Carnarvon Basin gas fields and the Mondarra Storage Facility.
Balancing	Market will overlay existing balancing arrangements.
Trading	Exchange for wholesale trading of gas products. Anonymous orders matched continuously to form transactions. Allow settlement of off-market trades. Develop services to support bilateral trading of capacity.
Products	Physical delivery of gas at a hub.. Spot and short-term delivery periods.
Gas Delivery	Each transaction creates a firm obligation to deliver gas. Bilateral gas delivery mechanism with delivery confirmation by trading participants.
Settlement & Prudential	Centralised settlement and prudential. Regular settlement of transactions, delivery variances and market fees. Credit support provided to cover settlement risk.
Market Information	Orders, trades, gas delivery and settlement information reported to participants. Publication of transaction price and quantity statistics.
Legal Framework	Enable market and market operator through rules based framework. The product specifications and standard terms could be set out in rules or contractual agreement.

Summary
High Level Design – Extended Model

Market Feature	High Level Design (Extended)
Gas Trading Hubs	Extend definition of Carnarvon Basin hub to include all inlet and outlet points in the Pilbara region. Extend definition of the Mondarra hub to include connection point to the Parmelia pipeline.
Products – Forward Products	Develop medium-term forward (e.g. from a few months out).gas products.
Products – Capacity Products	Develop exchange traded pipeline capacity products.
Gas Delivery Obligation	Net gas delivery obligations across transactions for each gas day and hub.
Gas Delivery Mechanism	Facility operator participates directly in the gas delivery process receiving transactions from the market operator and providing confirmation of gas delivery.
Settlement & Prudential	Combine settlement and prudential of the gas market and the WEM.
Settlement & Prudential	Apply the prudential processes of a clearing house to transactions in medium-term forward products.

Questions