

Do gas market designs support the development of gas for power generation?

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Agenda

- 1. Gas Powered Generation (GPG) is expected to play a significant role in the NEM under RET and Carbon pricing**
 - Open cycle and CCGT, depending on gas and carbon prices
- 2. OUR KEY QUESTION**
 - Do gas markets support the development of gas for power generation?
 - Focus on Victoria and the emerging national market
 - The Victorian gas market has been in place since 1999 and the national market is going to commence in June 2010.
- 3. Directions for market development**

Gas generation and climate change (1)

Gas powered generation (GPG) expected to increase

- particularly in balancing wind and partially substituting for coal
- OCGT and CCGT both expected to play a part depending on gas and carbon prices
- Jim Snow is talking tomorrow on gas for low carbon emission power on the east coast

The requirements of the gas supply system may change

- electricity load factor expected to continue to worsen
- Gas load factor for electricity may also be low, particularly if gas moves to global parity
- Demand for gas for peaking generation likely to be less predictable
- More flexibility may be required in supply systems

Gas generation and climate change (2)

The requirements of the gas markets will change

- Gas generation will be driven by the spark spread
- GPG are the classic marginal consumer of gas, gas value is directly driven by electricity price, set each 5 min
- To get scheduling and spot efficiency requires gas and transport to be traded
- Investment in flexibility requires that there be market signals to drive that investment

The emerging national market

MCE

- **Principles for Gas Market Development (December 2004)**
- Anticipate the convergence of the gas and electricity markets.
- One of the principles is that the gas market should be able to respond effectively to price signals in the electricity market
- The STTM operates under contract carriage - pipeline contract arrangements and distribution access arrangements were to be respected

ERIG

- Proposed formation of an integrated electricity and gas market operator (2007)

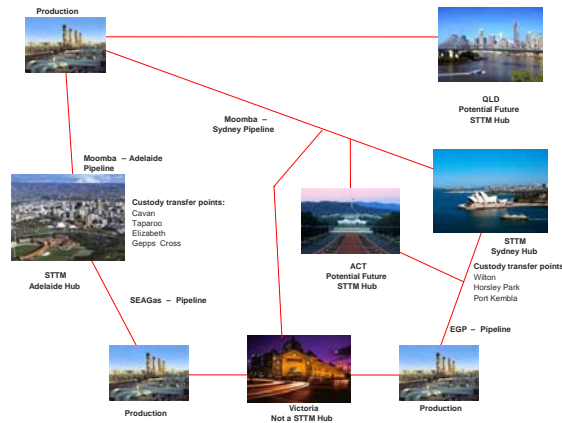
Bulletin Board

- A gas bulletin board commenced operation on 1 July 2008

STTM / AEMO

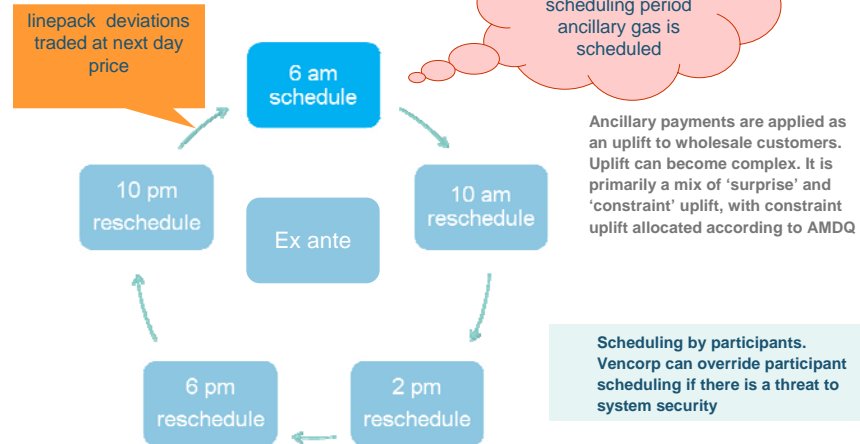
- A Short Term Trading Market (STTM) to replace the balancing markets in NSW and SA in June 2010
- Other States (Vic, Qld and Canberra) are to follow. Canberra is likely to follow quickly. WA has declined to participate at this stage
- Integrated electricity – gas market operator, AEMO

STTM Hubs



Refer to STTM Detailed Market Design – Phase 3

The gas market in Victoria



Experience with the Victorian Gas Market

Winter 2007 – showed weaknesses in the design

- The Victorian market design has been operating since 1999. A major overhaul commenced in 2004 and the new arrangements commenced in March 2007
- In winter 2007 the Victorian system was pushed to the limit due to it being extremely cold, the South West Pipeline requiring augmentation, and gas fired generation being required to replace coal plants which were unable to operate in Qld
- Constraints on a few days generated gross ancillary payments of \$96 million and a net amount of \$55 million (essentially \$55 million being paid for LNG and \$41 million 'traded' between market participants). There were major anomalies in uplift application
- Limited modifications were implemented in 2008. CRA were engaged to make recommendations to improve the design. (The CRA consultants involved are now with Oakley Greenwood).

Impact on GPG of Victorian market design

If there are no constraints

- GPG can bid into the market and buy and schedule gas.
- Gas can be sold back if not required.
- Economic signals are good – gas is available at market price whether to schedule additional gas or return gas

If there are constraints

- GPG may be constrained off
- If not GPG can acquire gas as an ancillary service on a pay as bid basis
- If gas is de-scheduled, ancillaries are backed out, but unwinding uplift is complex
- Economic signals poor, gas not necessarily at market price for dispatch or de-scheduling, and may be constrained off

CRA recommendations

CRA proposal

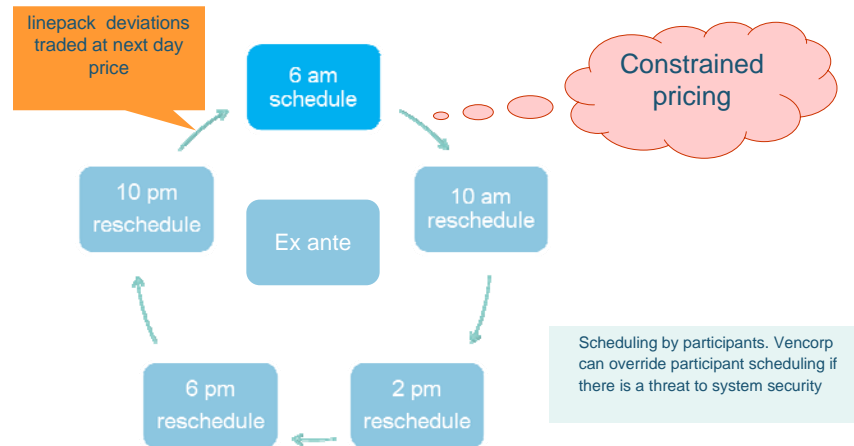
- **Price would be based on the constrained rather than unconstrained price**
- **Eliminates almost all ancillary payments**
- **Uplift is essentially no longer required**
- **AMDQ becomes irrelevant as there are no constraint payments**

Key features

- **This provides a single price for each scheduling period for which gas is traded**
- **Any party can adjust their position 5 times per day at the clearing price**

Our understanding is that it has been adopted by the Vencorp Board

The gas market in Victoria after changes



Impact on GPG

Price is the constrained price without ancillary payments

- GPG can bid into the market and buy and schedule gas
- Gas can be sold back if not required
- Economic signals are good – gas is available at market price whether to schedule additional gas or return scheduled gas
- Significant improvement on current arrangements
 - GPG able to schedule gas if price is attractive based on spark spread
 - Gas can be de-scheduled or rescheduled on 5 occasions during the day
- GPG may still be constrained off and may not set price gas
 - Access arrangements expect GPG to be curtailed on peak days when non GPG demand reaches maximum system capacity. GPG are expected to switch to diesel on the limited number of days

National gas market

Current situation

- REMCo is the market administrator in SA, GMC is the market administrator in NSW (AEMO now manages REMCo and GMC)
 - They manage the daily allocation of gas usage to retailers to enable settlement of gas supply and transmission contracts
 - The market applies penalties to market participants who deviate from forecast

STTM will replace the current arrangements in SA and NSW

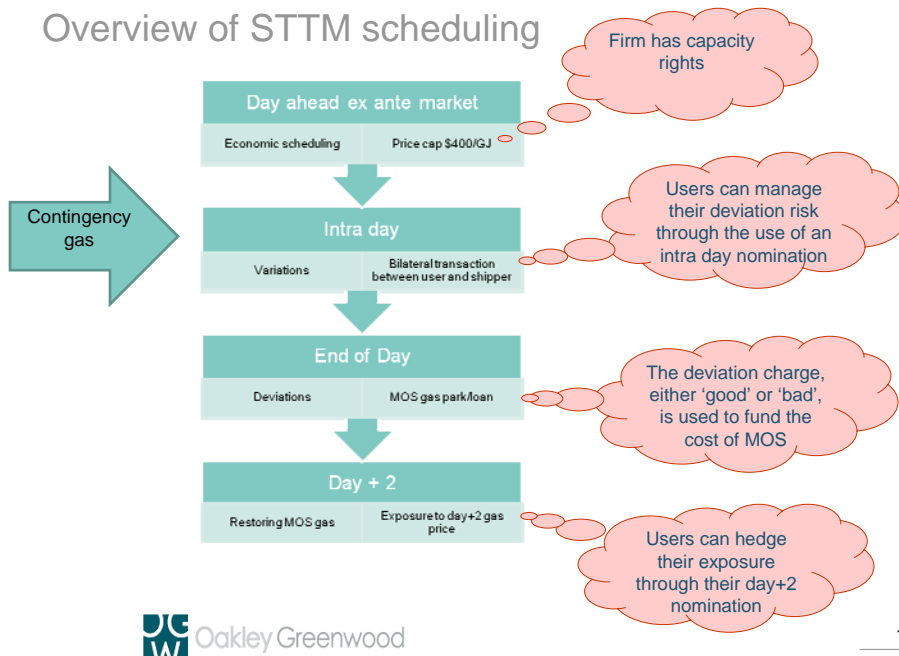
- AEMO will take over as market operator
- AEMO will receive bids and offers, run the market clearing engine and publish market schedules
 - Participants retain nomination rights to pipelines and can vary from schedule
- AEMO together with pipelines and networks will decide whether contingency gas is required
- AEMO does not manage emergencies

STTM design

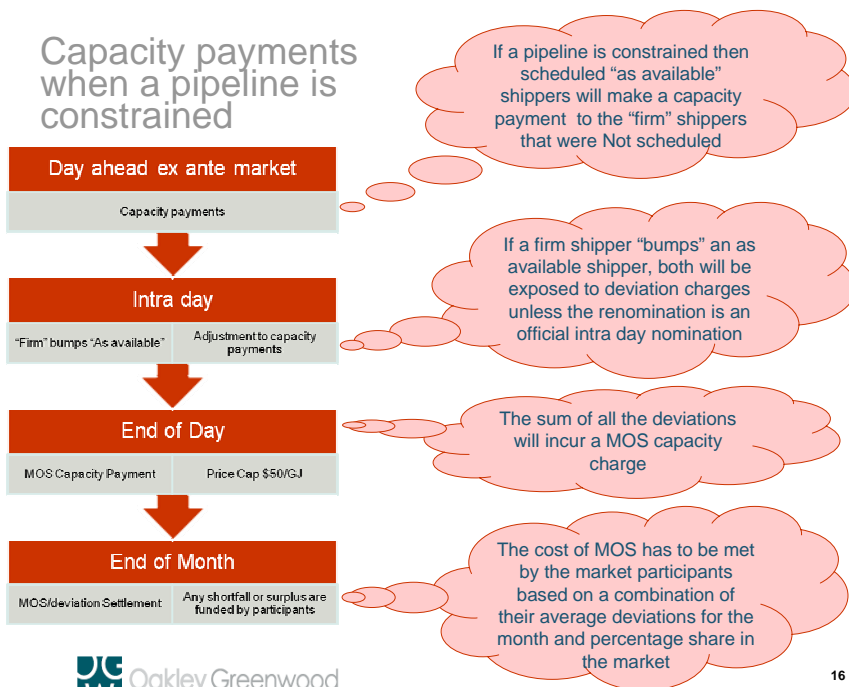
Proposed market design

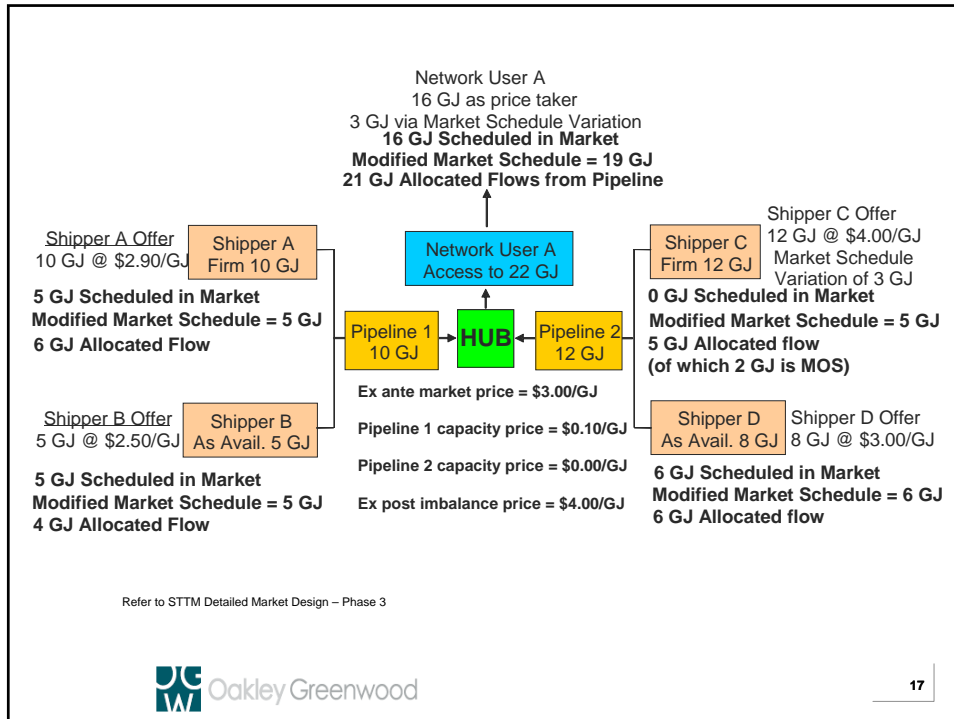
- 2 hubs initially, Sydney and Adelaide, with multiple delivery points
 - Market is separate from system operation
 - Pipelines and distributors are responsible for operation
 - Each hub has 2 pipelines (one pressure controlled and the other flow controlled)
- Day-ahead spot market with hub based ex-ante price
- Market must clear day-ahead
- Market prices energy at the hub as well as the value of constraints on pipeline capacity into the hub

Overview of STTM scheduling



Capacity payments when a pipeline is constrained





Impact on GPG inside the STTM (1)

Example 1 The GPG has firm transport and does not deviate

- Cannot be bumped
- There is no deviation charge
- There is no need to unwind deviation gas on day+2
- Not exposed to a socialised MOS charge at the end of the month

Example 2 The GPG deviates and has firm transport

- Cannot be bumped
- There is a deviation charge unless converted to a variation charge via an intra day nomination
- There may be exposure to the restoring of MOS gas on d+2
- Could be further exposed to MOS, if the sum of all participant deviation charges do not cover the full cost of MOS

18

Impact on GPG inside the STTM (2)

Example 3 The GPG has as available transport and is forced to deviate

- Can be bumped by a shipper with firm transport
- There will be a deviation charge unless there is an intra day nomination whereby the GPG turns down
- There may be exposure to the restoring of MOS gas on d+2
- Could be further exposed to MOS, if the sum of all participant deviation charges do not cover the full cost of MOS

Impact on GPG outside the STTM

Example 4 GPG is not in the STTM and has firm transport

- The GPG nominates to its pipeline
- Operates within contractual arrangements it has with the pipeline
- Any deviations are handled through those arrangements
- Can sell gas to the STTM
- Can sell firm transportation rights to as available shippers if it is not using them
- Can buy gas from the STTM provided it has a backhaul arrangement on the pipeline

Conclusions

Victoria

- Reasonably good environment for economic scheduling in Victoria except when there are constraints
- Market design changes planned to improve the design when there are constraints

STTM

- Increased transparency
- Improved environment for trading gas
- Some weaknesses evident in pricing and not always timely
- Complexity in understanding position
- Limited participation of large GPG

Directions for market development

Market and contract carriage + other compatibilities

- The compatibility issues between Victoria's market carriage design will need to be resolved with the national contract carriage design
- Market price cap, cumulative price threshold

Gas market responsive to electricity market?

- Has the MCE principle that the gas market should be able to respond effectively to price signals in the electricity market been met?
- Large GPGs are 'waiting and seeing'
- Still a gap
- Does electricity market need to change or just gas?
 - Gas needs to be scheduled, electricity market needs to take this into account

Scorecard

- Significant progress, but weaknesses remain in the Victorian and STTM designs
- A number of reviews are already planned. A lot of work still needs to be done to achieve a fully integrated national gas market and electricity market