An Australian Wholesale Gas Market

– *Its Justification, Framework and Governance*

Prepared by

Energy Retailers Association of Australia
Wholesale Gas Standing Working Group

September 2004

Contents

Executive Summary

Wholesale gas markets are required in Eastern Australia to manage increasingly complex energy portfolios, promote the development of additional gas fired power generation and its associated system wide benefits, and as a means of providing commercial discipline at times of system constraint, with the intention of avoiding intervention in market operations.

The key deliverable of a wholesale gas market is a simple mechanism that allows for the publishing of the marginal price of gas in any one trading period that truly reflects the value of that gas, at a specific location, in that period.

Whilst some parties see the development of a wholesale gas market and the development of emergency procedures as independent, it is the ERAA position that there needs to be a continuous commercial discipline over the market regardless of the market circumstances. These commercial mechanisms can't be developed independently of each other; they need to act as a continuum, with well-defined and agreed processes to allow the transition from a functioning wholesale gas market to a "market" where intervention occurs.

The ERAA has developed a set of wholesale gas market principles upon which it believes a wholesale gas market should be developed. These principles have been compared to existing market structures and have been used to determine the appropriate elements of a gas market structure that would suit Australia's circumstances.

The ERAA proposes a model similar to the North American model but with an alternative price setting mechanism that utilises aspects of the bid stack concept used in the UK market. This has the advantage in a small market with limited players of exposing all players to the market outcome and therefore focusing attention on the real value of energy rather than inefficient exercising of market power.

The intent of the market concept is to maintain the current operational requirements that are currently contracted and in place whilst developing a market that allows the posting of a gas price. The mechanism proposed prices the incremental GJ utilised on the system that comes from linepack held on the transmission system. The pricing of transmission pipeline imbalances is therefore the fundamental mechanism for establishing the value of gas during the trading period

This mechanism is not meant to impact on existing contractual positions but is meant to have a marked improvement on security of supply, pricing transparency, simplify spot market transactions and minimise transactional costs for both short and long term agreements whilst minimising regulatory shock.

This model would operate in all circumstances except where the bid stack was incapable of effectively clearing. Even with a wholesale gas market, there are parties (mass market retail customers) that are not directly impacted by the wholesale price and therefore won't respond to price signals – regardless of the price. Insufficient supply to ensure the safety of the distribution system or for essential services would see the market suspended and system demand centrally coordinated allowing the retailers to utilise their supply portfolios to meet reduced market requirements. The price of gas in these circumstances would be set at a default price.

The proposed structure is intended to break down the concept of a series of State based gas industries and introduce the concept of the Eastern Australian Gas Markets System, recognising that in the long run it may transform into an Australian Gas Markets System.

It is proposed that an independent, market responsive body manage the wholesale gas markets. This body would be governed by a Board of industry participants and would develop the rules, processes and prudential requirements for the markets operation. Some form of enabling legislation may be required to ensure parties participate and abide by the market rules.

It is recognised that a mechanism needs to be provide for the exchange of information and insights from industry to relevant government authorities to provide them with confidence that industry has the capabilities of meeting market requirements.

Processes and procedures need to be put in place to deal with a range of generic emergency or constraint events. These process and procedures need to be well understood by those parties (jurisdictions, industry and customers) that will be impacted by events and, given any specific event, these parties may reasonably anticipate the outcome. The intent is to bring predictability and cohesion to circumstances where severe system constraints create a vast range of predominantly disparate jurisdictional (and commercial) drivers.

1 The Need for a Wholesale Gas Market

1.1 The Basis for Change

There are three principal but related reasons for the development of a series of simple wholesale gas markets in Eastern Australia:

- The management of increasingly complex energy portfolios,
- The promotion of additional gas fired power generation and its associated system wide benefits, and
- A means of providing commercial discipline at times of system constraint, with the intention of avoiding intervention in market operations.

In essence, to provide a reliable, competitive and secure natural gas market and further increase the penetration of natural gas.

1.1.1 Portfolio Management

The Eastern Australian wholesale gas market has changed dramatically since reregulation and privatisation commenced in the mid 1990's.

The industry is no longer fundamentally stated based aggregated industries with single points of supply. The introduction of Full Retail Contestability, increased interconnection, the convergence of the gas and electricity markets, the partial privatisation of the Australian energy industry and several other factors has led to energy industry players having a spread of exposures in both electricity and gas, upstream and downstream in a number of states in eastern Australia.

In managing such a diverse portfolio, energy industry participants are seeking to more efficiently utilise infrastructure and at the same time increase security of supply. In order to capture these benefits participants need to ensure the seamless interconnection of separate gas markets, physically, commercially and legislatively to ensure there is a timely and uninhibited flow of gas in response to market requirements.

With deep-seated changes to the overall market risk profile, a wholesale gas market is seen as a relatively simple way to facilitate:

- System balancing on a day to day basis,
- A simple trading mechanism to assist in portfolio management,
- Provide reliable market signals on the value of energy in any one trading period,
- Encourage demand side management and provide a mechanism to trigger this service,
- Facilitate trade between markets, both geographically and energy types,
- Provide investment signals for the development of additional infrastructure, and

- System optimisation.

The key deliverable for all of the above is a simple mechanism that allows for the publishing of the marginal price of gas in any one trading period that truly reflects the value of that gas, at a specific location, in that period.

Retailers are seeking gas wholesale market arrangements that deliver:

- Transparency,
- Ease of transactions,
- Minimum cost,
- Minimum regulatory shock, and
- Ease of compliance.

1.1.2 Promote Gas Fired Power Generation

During the last 10 years growth of gas fired power generation has not been as significant as anticipated by both the gas and electricity sectors. To facilitate its expansion there will be a need for gas supply to be:

- Sufficiently flexible to deal with the variations in the electricity market,
- Provide some form of price certainty for scheduled running, and
- Provide a means of sourcing and hedging gas for unscheduled running.

A simple wholesale gas market can facilitate these elements.

In providing the right environment for the expansion of gas fired power generation, there are a series of benefits that accrue to the Australian energy sector as a whole.

- System growth, led by gas fired power generation, leads to increased utilisation of existing assets. To the extent that infrastructure is already well utilised in most markets this will ultimately lead to the need for system augmentation to cater to the increased gas fired power generation load. This enhances the overall integrity of gas infrastructure. The timing of investment and the type (and location) of the investment would also be signalled by a wholesale gas market.

- Gas fired power generation is price sensitive. Gas fired power generation is capable of running on alternative fuel sources such as fuel oil and is generally capable of relatively quick turn around both in stop / start operation and the transfer to alternate sources of energy supply if prices for gas are excessive. Gas fired power generation therefore offers significant and credible demand side management options.

- If the growth in gas fired power generation leads to system augmentation, a greater segment of the system capacity becomes price responsive load. With the introduction of an effective wholesale gas market parties (particularly to signal the value of gas when the system is constrained) then this will inevitably lead to a much more secure gas supply system.

  For instance; assume a further (say) 200TJ of peak day capacity is developed by both producers (or storage facilities) and pipeliners to meet an increased gas fired power generation load. Should there be a constraint on the system, the gas price will increase in response to the constraint. Should it reach a point where the gas fired power generators switch to an alternative fuel (or switch off and rely on electricity market hedging arrangements etc), this would leave the remaining load to source gas from a system that has been enhanced by an additional 200TJ.

- Additional gas fired power generation reduces the greenhouse gases produced per MWh of electricity generated.

1.2 Intervention

In developing procedures and market rules it must be recognised that absolute continuity of gas supply is important to the vast majority of end use customers. For simple physical and safety reasons gas distribution systems cannot be simply "switched off" in the same manner that electricity can if and when it becomes necessary due to a supply event (shortfall or catastrophic failure) or a major pipeline event.

Events such as the explosion incident at the Longford gas processing plant in Victoria have demonstrated the occasional need for extraordinary and dramatic action with respect to market intervention. By having to take all mass market customers off line, one by one, and later accomplishing the major logistical feat of safely relighting the pilot lights, this event demonstrated the substantial direct and indirect commercial and social cost of major constraint events.

The Victorian example whilst extreme has similar parallels in the South Australian and New South Wales markets.

Industry concerns relating to the management of these events, include:

- Allocation processes that are, complex, difficult to arrange quickly and require Ministerial sign off.

- The large number of parties required to develop a process going forward creating considerable conflict in commercial positions between pipelines, retailers, generators and others. Not all parties are always available to input to this process.

- No commercial incentive to voluntarily ration gas in the time it takes the Minister to make a decision, as there is no commercial driver to do so.

- Ministerial directions potentially causing dramatic changes in operations, due to their arbitrary nature and the need to bring about immediate impact (often due to the delay in decision making owing to the complex process). This creates operational risks and does not

always promote safe or best operating practice. This can have long-term implications for operational availability.

- Directions are often overly prescriptive on an hour by hour basis rather than a total quantity of gas, limiting operational and commercial flexibility.

- No account being taken of the commercially contracted capacity position actually held on pipelines by shippers.

- Allocation process that are not transparent, often based on ability to lobby at the time and who is asked (and available) to be included in the decision making process.

- Pre agreed mitigating agreements being superfluous based on the existing process.

It is the ERAA's view that emergency events are best managed if there is a commercial impact on parties that do not respond appropriately to a dramatic change in market circumstances.

Changes in market circumstances are a continuum. At their simplest, the market can easily deal with small outages or constraints. As these outages or constraints become more serious the market response becomes more onerous and costly. Ultimately there comes a point where the supply outage or constraint is so severe that regardless of effort, or cost of supply, the market response is incapable of managing the shortfall. At this time demand will need to be centrally managed to allow the remaining supply to be used appropriately.

The ERAA sees the development of a wholesale gas market and the development of emergency procedures as a continuum, requiring a continuous commercial discipline over the market regardless of the market circumstances. This is further developed in Section 3.

As part of this process ERAA is seeking:

- To provide a mechanism to limit intervention during times of constraint,

- Commercial certainty in the operation of evolving gas markets,

- Procedural certainty, at times where the market fails for any reason and,

- A clear transition from market rules to the central coordination of the system under established procedures.

1.3 CoAG Agenda

The implementation of a gas market aligns with a key recommendation of the independent Energy Market Review (Parer et al, 2002)[1] for the Council of Australian Governments (the Parer Report). The report indicated that in order to have a competitive and dynamic gas industry then market supporting mechanisms such as the ability to trade gas were required.

[1] "Toward a Truly National and Efficient Energy Market, Council of Australian Governments Energy Market Review", Parer, W. R, Breslin, P., Sims, R., Agostini, D., 2002

2 Wholesale Gas Markets

The ERAA has developed a set of wholesale gas market principles upon which it believes a wholesale gas market should be developed. These principles have been compared to existing market structures and have been used to determine the appropriate elements of a gas market structure that would suit Australia's circumstances.

2.1 Gas Market Principles

The ERAA market framework is based on the following principles:

- Wholesale gas market arrangements should be allowed to evolve to meet the needs of market participants and their customers rather than being imposed by government;
- The market should match as closely as possible the physical capabilities of the system to maximise market efficiency;
- Gas market functions should be managed by an independent, market-responsive body (models may include GMCo, REMCo, new industry cooperatives, etc.);
- Complicated or costly market arrangements requiring extensive bureaucracies are not appropriate;
- Gas market arrangements will recognise and operate in concert with the balancing requirements of both the distribution networks and the transmission pipelines;
- Bilateral gas purchase and transportation contracts will remain in place; the gas markets will provide a supplementary source of supply either for balancing or to meet longer term demands both for existing and new players in each market;
- At least in the short term, separate markets will need to remain in place for each capital city (the geographical extent of each market will be a matter for later discussion, as will arrangements to cater for regional centres, and the question of markets at supply points such as Moomba or Wallumbilla);
- There should be close cooperation between the jurisdictions both in the development of market structures and in their ongoing operation to ensure no hurdles to interstate trading occur;
- Compliance with market rules should be a condition of participation, with some enforcement mechanism (important questions such as prudential arrangements will need to be resolved);
- Effective operation of the gas markets may impose some requirements on the terms and conditions of service offered by both transmission pipelines and distribution networks (in particular services they may wish to offer in relation to balancing, "park and loan" as well as nomination processes / timing.). This is to be minimised.
- The existing framework for both unregulated and regulated access to pipelines is compatible with the development of on-the-day gas markets;

- The contract carriage model, governed either by access arrangements under the Gas Code or by voluntary codes of practice, is compatible with evolving gas market arrangements, although some fine tuning may be needed to individual terms and conditions to ensure compatibility (this will need further investigation); and

- The Victorian market carriage model was designed to support retail contestability and multiple supply sources, but a number of features in the current rules are causing concern. These are being addressed and if the recommendations by the market operator are acted upon, this should allow the Victorian market to interact with the proposed framework.

- The market structures should have a regulatory and governance framework fully compatible with the energy market reform package as announced by the MCE in December 2003

- Governments should have sufficient comfort in the operation of the market in order to divest, or at least not utilise, the powers of direction that are current employed during times of constraint. The market should be designed to deliver that amount of information required to provide this comfort.

- The design of the market should include a very clear process on the procedures for market suspension and/or curtailment, and the criteria upon which a move to an intervened market would be made.

- Many transition issues would need to be addressed, including
    - some time for participants to adjust to a new commercial discipline, and
    - for the convergence of existing imbalance markets and governance structures currently operating in NSW and SA

2.2 Gas Market Models

The Australian Bureau of Agricultural and Resource Economics prepared a report on "Australian Gas Markets, Moving Towards Maturity" (ABARE, 2003)[2]. The report was a good summary of the current state of the Australian gas market environment and market options.

The report identified the differences between the North American gas market with:

- 8000 producers (the 40 largest producers have only 30% of the total production),
- 580 gas-processing plants
- Over 400 storage facilities
- 460,000 km of mainly point-to-point transmission pipelines (inter and intra state)
- 1200 local distribution companies and
- 260 marketing companies
- Market consumption of approx. 23,000 PJ/annum

The UK gas market with:

[2] "Australian Gas Markets – moving toward maturity" December, 2003, C Short, A Heaney and Kevin Burns for Australian Bureau of Agricultural and Resource Economics

- 50+ producers (100+ gas fields) plus imports
- 8 processing terminals
- 5 LNG facilities and a large UGS facility
- A 6,400km radial national transmission system and 62 marketing companies
- Market consumption of approx. 4,000PJ/annum

And the Australia situation with:

- Limited supply options, currently dominated by 2 main supply joint ventures but with more producers due to come on line
- 21,000 km of transmission pipelines - limited to single point to point pipelines (with the exception of elements of the GasNet system in Victoria) between gas supply points and markets
- Limited commercial storage, both UGS and LNG
- Limited market players, currently dominated by an incumbent retailer with the exception of Victoria that has 3 established incumbent retailers.
- Market consumption of approx. 500PJ/annum (Eastern Australia)

The North American market consists of a bilateral market with pricing established at "Hubs". Hubs are convenient points to price gas, usually associated with a series of interconnecting pipelines and nearby storage, capable of providing market services. The underlying primary market of gas supply agreements and contracted carriage on transmission pipelines has led to a highly liquid and deep market in spot gas. Whilst essentially a laissez faire market utilising bilateral trades, US authorities have approved standard spot trading contracts and processes for trading that the industry has established. The large number of parties has enabled this approach to work effectively.

The UK approach is based on a pool market. This approach was developed based on a different market philosophy and the fact that the gas transmission system is so much smaller for the size of the market. The pipeline system is a series of small, interconnected pipelines with limited linepack and a strong reliance on storage for daily system operations. The system is treated as a single system and one price applies at a notional balancing point.

Given the large point-to-point pipelines and the significant associated linepack the Australian gas system, is physically more akin to the North American system than the UK system. The obvious point of difference is the lower number of system participants. With so few participants ERAA argues that there is insufficient market liquidity and depth for a simple bilateral market to set a market price for gas that truly reflects the value of that gas, at a point, at a point in time, on all occasions.

It is apparent that the systems discussed above are unique and have evolved to meet unique market circumstances. The North American market best meets the market principles put forward in Section 2.1. However, it is apparent that the price setting mechanism isn't appropriate due to the limited number of market players..

2.3 Gas Market Concept

Gas market models are made up of a large number of elements that need to come together to meet existing market conditions, requirements of the market going forward and variable

perceptions of what makes an efficient and effective market. On this basis the ERAA recognises that several market concepts could fulfil the requirements of the gas market principles put forward in Section 2.1.

In Appendix 1 the ERAA puts forward a possible gas market concept that meets the requirements of the gas market principles. In putting this concept forward the ERAA recognises that several elements of this model could be varied and still meet the ERAA's criteria. The concept is therefore put forward as a practical and somewhat pragmatic example to aid debate on this subject and to demonstrate the general form of a wholesale gas market as conceived by the ERAA.

The ERAA concept is similar to the North American model but with an alternative price setting mechanism that utilises aspects of the bid stack concept used in the UK market. This has the advantage in a small market with limited players of exposing all players to the market outcome, focusing attention on the real value of energy rather than inefficient exercising of market power. Prices can be posted for each trading period.

This model would operate in all circumstances except where the bid stack was incapable of clearing, due either to an emergency event or insufficient capacity (supply or transmission).

The concept is intended to provide price certainty prior to the gas day for those parties wishing to buy gas to meet their shortfalls or to sell excess gas supply at a known price. Flexibility is provided via appropriately negotiated contractual rights or spot services provided by producers or transmission providers.

3 Market Intervention

As stated in Section 1.2 industry has concerns relating to the management of emergency and constraint events. It is recognised in some circumstances, even with a wholesale gas market, there are parties (mass market retail customers) that are not directly impacted by the wholesale price and therefore won't respond to price signals – regardless of the price.

Retailers recognise that in such circumstances, if supply to essential services is threatened or the integrity of the gas supply system is at risk, that it is appropriate for the management of the gas demand to be centrally coordinated.

It is the ERAA's position that there is an urgent need to review gas rationing and gas emergency procedures in all jurisdictions

In order for this to occur ERAA sees the need for the following way forward.

- The development of better defined emergency procedures,
- The development of gas rationing principles, and
- The development of a market supporting mechanism for period where the wholesale gas market is suspended.

3.1 Emergency Procedures

The ERAA proposes the following:

- There should be clear definition of the circumstances under which any market rules would be suspended or resumed.
- Jurisdictions will have a legitimate interest in the development of procedures for the coordinated management of gas demand in the event of extreme circumstances where there is a clear threat to public safety and / or may ultimately require the shut down of substantial elements of gas distribution networks. Where this is the case Shutdown Tables will need to be developed for shutdown / reductions in gas use. In developing these Tables parties will need to balance the impact on the system, ease of operation, and capacity to maintain essential services. These Tables should be developed in conjunction with industry and made public.
- Due to the interconnected nature of the gas system and where events have a wider impact, jurisdictions will need to development a meaningful agreement (between SA / NSW / Vic / Tas / Qld / ACT) on the use of emergency gas powers between the jurisdictions during a gas crisis. This should be developed in conjunction with industry and made public

  This agreement would need to consider how the interconnected states of South Australia, Victoria, Tasmania, NSW, ACT and (most likely in the near future) Queensland[3], deal with a catastrophic failure in a key production / transmission facility.

[3] In the future possibly Western Australia and / or Northern territory

3.2 Gas Rationing Principles

ERAA proposes the following[4]

- Gas rationing processes needs to be transparent, fast (or pre agreed), flexible and quarantined from self interest at the time of the constraint,

- Parties should know in advance the rationale for allocating capacity to reduce the arbitrary nature of the allocation,

- Parties to have notional rights (but not necessarily physical rights) to gas on the day via an allocation mechanism. This mechanism should recognise parties contractual rights to pipeline capacity but also recognise the implications to these users in providing gas to critical social services that must remain on line (eg hospitals), and

- Preference for commercial drivers over legal drivers. Commercial entities tend to respond in their own commercial best interest rather than potentially ambiguous legal process.

3.3 Suspended Wholesale Gas Market Mechanism

It is ERAA's desire to see an appropriate market mechanisms developed that would allow gas users to respond in a manner that minimised the need for direction regarding the right to consume gas.

In circumstance where a gas market is incapable of clearing, the market will need to be coordinated using direction. In such situations there should be a default value of gas to maintain a commercial discipline in the absence of a market set price. The value of this gas will need to be determined but it should recognise the value of alternative means of supply and the level of security of supply required by the market, including the social value of uninterrupted supply. The default value of capacity should not be disproportionate to the circumstances.

Parties who use more gas than they are notionally entitled to will pay those parties who use less gas than they are notionally entitled. This would be based on the finalised gas rationing principles.

The intent of the proposed mechanism is to ensure:

- The market values gas at times of constraint,

- The incentive is in place to invest in system security or maintain viable options for gas supply. If parties are precluded from capturing the full value of capacity during peak periods or when capacity is constrained it takes away the incentive to invest in alternatives,

[4] These principles are in general agreement with ESCOSA Report "..suggested improvements to the process:" Page 50 – 51 (i) to (v)

- The market doesn't become "lazy" and rely on direction when it is capable or has the drivers to deal with the constraints itself, and

- Parties have the incentive to take their own view and work to reduce their own exposure in a quick and efficient manner even prior to direction.

A desired outcome is for parties to react in such a manner that direction is not required, except in extreme circumstances.

Logically, commercial organisations faced with a wholesale gas market in the first instance and a default value of gas in the second instance will ensure they assess their exposure and take measures to "insure" against high priced outcomes if the exposures are considered unacceptable.

A known default transfer price will allow the negotiation of alternative arrangements prior to any event occurring. In agreeing the price of alternatives, parties will be able to take a view on the following:

- Frequency of events,

- Timing (time of year/day – impact on market/s),

- Degree of constraint,

- Own needs, and

- The value of alternatives:

    - Additional capacity on the impacted pipeline (increasing the party's notional access to gas at times of constraint). Increased demand for pipeline capacity should lead to the enhancement of the capacity in the pipeline and increase system security,

    - Install alternative source (fuel oil etc or alternative gas supply system eg SEAGas, EGP, Storage, VicHub),

    - Spot purchase at default value of gas, and

    - Curtailment.

3.4 Management of Emergency Procedures

3.4.1 Managing Supply Portfolio Complexity

Complex market interrelationships, competition, the interconnected nature of the various load centres, the use of gas storage and the interrelationship between gas and electricity, has led retailers to develop a complex portfolio approach to gas supply in order to optimise infrastructure utilisation, minimise cost and reduce exposure to variations in market load. Given the unique circumstances of every retailer, these positions cannot be reproduced and it is inappropriate for third parties to manage the retailer's supply and transmission positions.

3.4.2 Managing Pipeline Operations

Unlike electricity, the need to utilise linepack to optimise the management of individual gas pipeline systems means that individual pipeline operators are best placed to manage their own systems and not a central system operator. This is carried out under the contractual arrangements pipeline companies have in place with their shippers[5]. These contracts routinely address the allocation of gas in the event of shortfall in supply into the pipeline system or constraints on the pipeline itself.

3.4.3 Demand Management

It has already been acknowledged that in anticipation of emergencies, jurisdictions will need to develop some form of Shutdown Tables to manage demand. It has also been recognised that the coordination of these tables throughout the whole of the eastern Australian Gas System will need to be agreed to bring predictability and cohesion to circumstances where severe system constraints create a vast range of predominantly disparate jurisdictional (and commercial) drivers. If these system constraints are not appropriately addressed the outcome may not be in the best interests of the overall system efficiency.

A range of process and procedures need to be developed and understood by those parties (jurisdictions, industry and customers) that will be impacted such that these parties may reasonably anticipate how demand will be managed during "generic" emergency events.

At the moment the exercising of these powers may well be in the best interest of the State in questions but not for the overall Eastern Australian Gas System.

Pre-emptive work to manage demand during emergencies may require:

- Disclosure by industry (via the Gas Market Operator) of information relating broadly to gas market supply capability and demand requirements for the development of generic constraint scenarios.

- The develop of "constraint scenarios" in conjunction with industry, to provide jurisdictions and industry with "what if" analysis, transparency and understanding of what would happen in the case of certain generic events.

- Development of a methodology to continually inform the market as to the status of the constraint event, reporting to jurisdictional representatives, industry representatives and the market at large. This would include gas and electricity system operators.

[5] These agreements do not exist on electricity transmission systems. This is a fundamental difference between electricity and gas system operations.

4 Eastern Australian Gas Market Governance

The intent of this section is to provide a basis for how a wholesale gas market and associated intervention processes would align with the proposed Council of Australian Governments (CoAG) energy industry governance structure. This structure is intended to break down the concept of a series of State based gas industries and introduce the concept of the Eastern Australian Gas Markets System, recognising that in the long run it may transform into an Australian Gas Markets System.

A constant theme in this paper has been the role of industry developing sophisticated energy portfolios to meet a diverse market that encompasses both electricity and gas. It is important that the integrity of these portfolios is maintained. Considerable investment has been made to develop what are combined investment and risk mitigation strategies. Government intervention in these strategies, even during periods of severe system constraint, may corrupt these portfolios and therefore the drive to invest in their development. The emphasis during market intervention needs to be on the level of market demand, allowing the retailers to utilise their portfolios to meet market requirements (during these periods of intervention) in the knowledge that in all circumstances there is a commercial incentive to do so.

A key issue broached in this paper[6] is the level of disclosure that may be required for a functioning wholesale gas market. Within this structure disclosure would serve two purposes, to better inform the market and to provide government Ministers responsible for energy policy a level of insight into market capabilities and therefore a level of comfort in the markets operation.

Discussion in this section is based around the governance structure in Figure 1. This figure is based on an interpretation and extrapolation of the proposed CoAG industry governance reforms and where it is likely that industry will link into this structure. It is acknowledged that this figure may not exactly reflect the final outcome and that the detailed development of this structure will be developed over time. Whilst work will initially focus on electricity transmission, it is recognised that the same structure will need to cater for gas industry administration, rules development and regulation and that it is appropriate to ensure that the structure put in place is appropriate for the development of a dynamic gas industry.

4.1 Wholesale Gas Market Operator

It is proposed that an independent, market responsive body manage the wholesale gas markets. This body would be governed by a Board of industry participants and would develop the rules, processes and prudential requirements for the markets operation.

There will need to be a mechanism to enforce these rules. Certainly the existing gas supply and transmission arrangements provide legally binding arrangements for much of the underlying supply capability but the rules themselves may require some form of enabling legislation to compel parties to participate and abide by the rules. This requires further work but the market operator would presumably interface with the AEMC on this issue.

It may be appropriate, depending on the final structure and having regard for commercial sensitivities, for the market operator to aggregate industry demand and supply position.

[6] This issue is raised in response to feedback from senior bureaucrats to the Intervention and Gas Market Papers.

4.2 Industry Feedback to Government

In accepting responsibility for the development and management of the Wholesale Gas Market, the industry will need to develop a feedback mechanism to the relevant government authorities in the various jurisdictions. This mechanism will need to allow for the exchange of information and insights from industry to relevant authorities, provide them with the confidence that industry has the capabilities of meeting market requirements, raise any concerns or issues relating to the market structure and its operation.

Information to be included in this feedback could be aggregated by the independent market operator may well include:

- Storage levels / capabilities,
- Pipeline capacities,
- Production capacities,
- Broad demand positions, and
- Demand side management.

4.3 Ministerial Council on Energy (MCE)

The MCE is a sub committee of CoAG and has as its members the energy Ministers from all States and Territories. It is the most senior jurisdictional energy forum in Australia. The decision making capacity of this group only defers to the First Ministers Forum of CoAG on energy issues. It is generally accepted that the First Ministers Forum agrees to most issues that have been agreed within the MCE.

The MCE is therefore the key energy policy development forum in Australia and its members have absolute responsibility for energy issues. In the new CoAG governance structure it is anticipated that the MCE will provide policy to the AEMC who will act upon this guidance.

The MCE as a group need to be confident that the energy industry is responsible and capable in nearly all circumstance of maintaining the integrity of the gas system. However, the MCE will recognise that from time to time, severe constraint events (either supply or key transmission constraints) may facilitate the need to have central coordination of demand.

As discussed previously, without the operational understanding of the energy portfolios held by the retailers, it is impossible to second guess the individual responses of the industry. It is therefore more appropriate for the MCE to seek a level of comfort that the consolidated portfolio positions are satisfactory to meet demand and allow the retailers to manage their own portfolios.

The individual Ministers within the MCE and the MCE jointly will have the responsibility for the development of policy relating to, and the actual development of, the Shutdown Tables for industry and commerce within their individual States and the coordinated shutdown of the distribution systems if and when this may be required. Presumably this would be done in conjunction with industry.

Jurisdictions should also recognise that the existing laws governing the industry from State to State (specifically those dealing with emergencies and constraint event management) need to be coordinated to allow effective demand management of the system as a whole. This will require the cooperation of all jurisdictions and presumably this will not come about without the various jurisdictions having comfort in the industry approach to these issues and an ongoing mechanism to retain confidence in the industry approach.

4.4 Australian Energy Market Commission (AEMC)

The AEMC is expected to be the peak rules development entity and energy industry administrator in Australia. It is also anticipated that it will provide advice to the MCE on energy issues and receive policy input from the MCE. It will therefore play a key role in the Australian energy industry and the development of related legislation.

The AEMC would have an important role in maintaining a series of industry working groups to provide input to the AEMC's various areas of responsibility. Amongst these groups the following would need to be determined:

- The definition of the interface between normal market operations and emergencies intervention in demand management
    - Under what conditions would intervention occur?
    - How would this be determined?
    - Under what conditions would intervention revert to market operations? How?

- The implementation of a mechanism to compel parties to participate in the wholesale gas market.

4.5 ACCC / Australian Energy Regulator (AER)

There may be a requirement for ACCC / AER approvals dependent on the final market structure.

4.6 Industry

It is industry's preference to take as much responsibility as possible in the development and management of wholesale gas markets on the Eastern Australian Gas Markets System.

Industry should recognise that even the simplest market is likely to require some form of legislative support.

Throughout this paper it has been assumed that industry will play a lead role in the development of the wholesale gas market, the jurisdictional interfaces and the processes, procedures and methodologies that need to be developed, especially those relating to market intervention.

Specifically these include:

- The development of a Wholesale Gas Market

- A role in providing feedback to government
    - Provision of supply and demand data for aggregation and presentation to the Forum
    - Interaction on market issues.

- Industry working groups, if required, particularly relating to AEMC rules and process development
    - Development of market and government interfaces, particularly around intervention
        - Processes
        - Procedures

- Involvement with the development of the Shutdown tables
    - Interaction with customers
    - Education

- Involvement in implementing procedures during severe constraint events.

Appendix 1

5 A Gas Market Framework

5.1 Proposal

The following provides a detailed description of a market model in line with the market principles set out in Section 2.1. It is based around current industry practices as outlined in Appendix 2 and is an effort to assert that a concept derived from these principles can work at a significant level of detail.

In summary, the model represents a nett, ex ante commodity market, posting prices daily, nominally at the "city gates" of significant markets. These "city gates" would be focused on large market loads and in the first instance would be based around State capital cities but over time could be extended to include large regional loads.

5.2 Detailed Market Concept

5.2.1 Demand Curve Development

- On the morning of D-1 (the day prior to the gas day in question) all[7] parties who participate in that particular wholesale gas market provide bona fide demand/price data to the market operator. Bona fide estimates for the following 2 gas days would also be required in a similar timeframe, D-2 and D-3.

- Customers taking too much or too little gas from the system against their forecasts will bring about the nett gas system imbalance. Alternatively gas suppliers having too little, or too much, gas injected into the system against their nominations may also produce an imbalance. Or a combination of both.

  The pipeline operator would monitor the current gas day operations. At a time close to the end of the current gas day (say 3 hours prior?), the pipeline operator, utilising all information available and past operational experience, would estimate the probable nett system imbalance for the end of the current gas day. At this time the pipeline operator (based on pre agreed parameters transparent to the market)[8] would determine if additional gas, in excess of forecast demand, is required on the following gas day to increase linepack. Alternatively, if there is an excess of linepack how significantly injections into the system will need to be reduced below forecast demand on the following gas day. There will need to be a mechanism to reconcile the estimated position with the actual position.

---

[7] All parties means all Shippers who can provide a bundled gas supply and transmission services to the market (under contract or directly) and / or parties who withdraw gas at the market point in their own right. Producers who only provide services under contract would not be exposed to the market.

[8] Variations in the requirements for system linepack are often incorporated in transmission contracts which would be transparent to individual contracting parties.

- The independent market operator utilising the data provided above develops a simple total system demand curve.

5.2.2 Supply Curve Development

- On the morning of D-1 (the day prior to the gas day in question) all parties who wish to offer gas at the market point via the wholesale gas market provide bona fide supply/price data to the market operator. Bona fide estimates for the following 2 gas days would also be required in a similar timeframe, D-2 and D-3. Those parties offering supply based on third party gas supply and transmission agreement, bid knowing the capabilities of their contracts, their flexibility and tolerances and are responsible for the performance of these contracted positions.

- The independent market operator utilising the data provided above develops a simple total system supply curve.

5.2.3 Clearing Price Determined

- The independent market operator would develop supply and demand curves for the following (3) gas days from the data and established a preliminary clearing price for the following gas day. The clearing price for D-2 and D-3 would be indicative and for information only. It would be appropriate for the supply demand curve (or at least key sensitivities, (say) 5, 10, 15, 25% variances in supply or demand) so that the market is informed. See Figure 1.

- On the basis of the supply and demand curve, those parties that have offered supply up to the clearing point on the supply and demand curve would be notified and would make those nominations to both their third party gas suppliers and pipeline operators (as required) by (say) midday.

- If the pipeline operator determines that additional gas is required to rebuild linepack then the demand would need to be added to the supply demand curve established on D-1 (see Section 5.2.1). This may alter the clearing point of the supply and demand curve and increase the price. See Figure 2. Those parties required to amend their supply/shipping nominations prior to the commencement of the gas day would be notified.

- If the pipeline operator determines that linepack in the pipeline is excessive then the demand would need to be subtracted from the supply demand curve established on D-1 (see Section 5.2.1). This may alter the clearing point of the supply and demand curve and may decrease the price. See Figure 3. Those parties required to amend their supply/shipping nominations prior to the commencement of the gas day would be notified.

- In the situation where the D-1 supply and demand curve is amended and a revised market clearing price is determined, the revised market clearing price would become the firm gas price coming into the upcoming gas day.

5.2.4 Portfolio Optimisation

- In a perfectly forecast world all demand would be perfectly met by supply at the clearing price for that day. So long as parties utilise the demand they have indicated and so long as gas suppliers provide gas as they have bid (and had accepted) then the market will be in balance. Parties that meet their demand and supply forecasts will clear their nett positions at the market clearing price.

  For example, a shipper withdraws 20TJ from the system as forecast in its demand/price bid. Assume this same shipper nominated a range of prices at which it was prepared to provide gas supply but all of its bids were above the market clearing price except for a 10TJ bid. The shipper is requested to supply10TJ of gas, and does. This shipper is deemed to have purchased an additional 10TJ from the market on this day to make up its total 20TJ load and does so at the market clearing price applicable on the day.

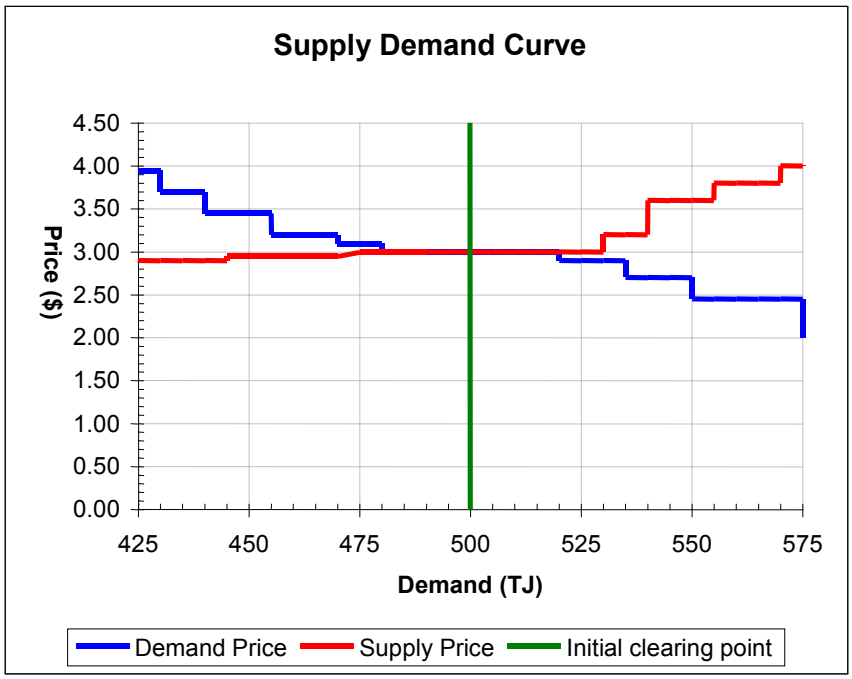

Figure 1

The blue curve shows part of the demand curve created from all of the demand price bids submitted by parties who intend to take gas from the system at the relevant market point on the gas day in question. The red curve shows part of the supply curve created from all of the supply price bids submitted by parties capable of, and prepared to supply gas on the day, either directly in the case of producers or indirectly in the case of parties who have contracted gas supply. The green line shows the point (in this case the mid point) where the two lines cross or "clear" and the corresponding demand. In this case the x-axis shows the demand to be 500TJ (although the price will remain constant over the range 480 – 520TJ) at $3.00/GJ - shown on the y-axis. Based on this scenario the parties who bid to supply gas up to 500TJ will inject (or have injected) that gas. Any party who is not required to provide sufficient gas to cover its own demand in the market would pay $3.00/GJ up to the forecast demand.

5.2.5 Pricing of Imbalances

- For any imbalance away from the shippers forecast demand, or for any imbalance in nominated injections, then this gas will be subject to the market.

- In the situation where additional gas is required to increase the linepack, parties that had a nett negative imbalance and were required to make up gas supply to the system would carry this imbalance into the coming gas day and would be required to pay for the imbalance at the revised market clearing price for that day.

- In the situation where excessive gas resides on the system and a reduction in linepack is required, parties that had a nett positive imbalance and were required to draw down gas supply for the system would carry this imbalance into the coming gas day and would be required to sell the imbalance at the revised market clearing price for that day.

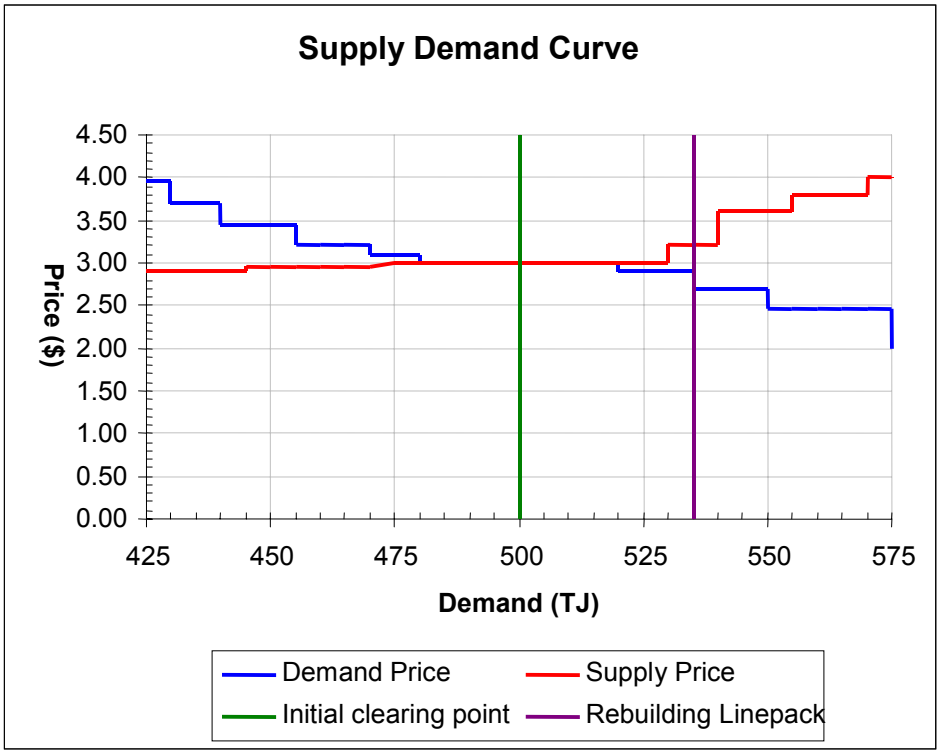

Figure 2

This curve was created as per Figure 1. This curve assumes that on the previous day more gas was taken from the system than injected (35TJ more in this example). This demand has been added to the supply demand curve created on D-1such that the total demand is now 535TJ (shown by the purple line crossing the x axis 35TJ higher than the forecast demand). This has slightly increased the price from $3.00 to $3.20 (where the purple demand line crosses the red supply curve). Based on this scenario the parties who bid to supply gas up to 535TJ will be requested to inject that gas. Any party who is not required to provide sufficient gas to cover its own demand in the market would pay $3.20/GJ up to the required demand of 535TJ. The required demand is made up of 500TJ of forecast demand plus 35TJ of gas to rebuild linepack.

5.2.6 Intraday Flexibility

- During the gas day, if there are unanticipated variances to a parties demand or changes in supply capability, parties may utilise services (rebid capability, park and loan, nominate alternate delivery/receipt points) and flexibility in existing gas supply and transmission agreements to manage/minimise their imbalances. This may mitigate any exposure to long / short positions in the next days bid stack.

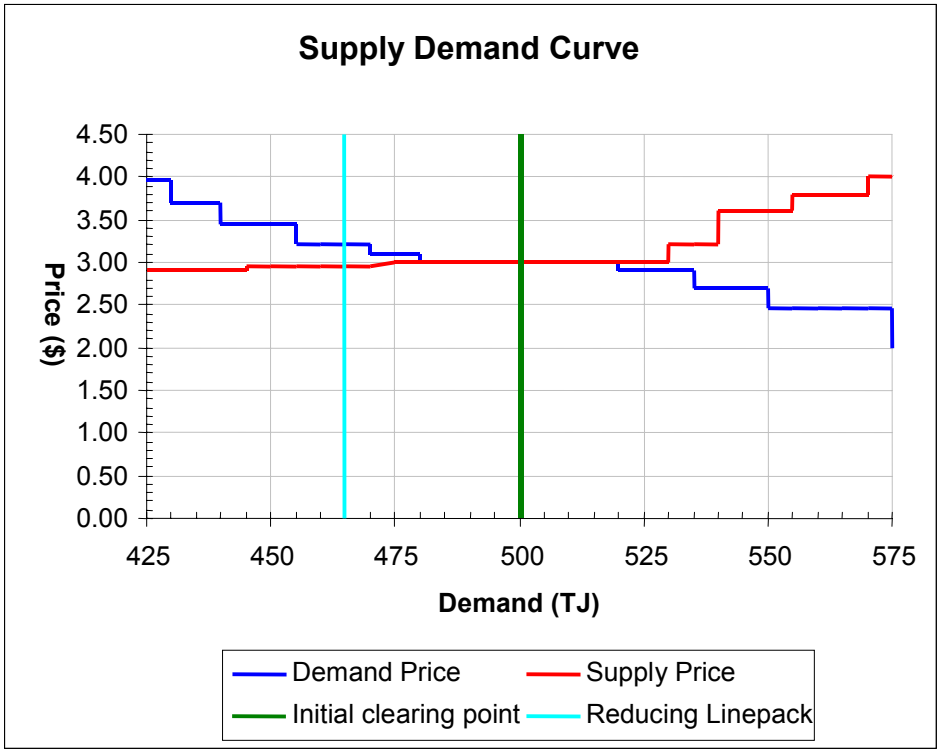

Figure 3

This curve was created as per Figure 1. This curve assumes that on the previous day less gas was taken from the system than injected (35TJ less in this example). This demand has been reduced from the supply demand curve created on D-1such that the total demand is now 465TJ (shown by the cyan line crossing the x axis 35TJ lower than the forecast demand) and this has slightly reduced the price from $3.00 to $2.90 (where the cyan line crosses the red curve). Based on this scenario the parties who bid to supply gas up to 465TJ will be requested to inject that gas. Any party who is not required to provide sufficient gas to cover its own demand in the market would pay $2.90/GJ up to the expected demand of 500TJ – it assumes that the excess linepack will be sold. The nominated gas supply (465TJ) plus the linepack (35TJ) meets the forecast market demand (500TJ).

- These arrangements may require a shipper to inject gas / take gas on the following day in order to meet its obligations under the services agreement to the gas supplier or pipeline operator. This will occur separately from the market, unless the shipper doesn't meet its obligations in which case it will impact its nett balance position for the day (any default under bilateral service contracts will be dealt with under the terms of the contract). The provision of services and off market agreements will need to be taken into account by the pipeline operator when determining variations to linepack immediately prior to the coming gas day.

- It should be noted that parties are required to meet the obligations of their contracted positions and the market rules at all times. Unlike the Victorian market, parties will have rights and obligations with respect to supply and transmission. Shippers will not be able to simply take gas off the system as and when they wish, but rather provide the operator with its intentions prior to the day via the nomination process (standard practice). To the extent a shipper's requirements vary during the gas day, the shipper will be required to operate within the parameters of its existing contracts or take additional positions to allow it to meet its variations.

5.3 Discussion

5.3.1 Intent

The intent of the market concept above is to maintain the current operational requirements that are currently contracted and in place whilst developing a market that allows the posting of a gas price that truly reflects the value of gas during the trading period in question. The mechanism proposed prices the incremental GJ utilised on the system. It assumes, based on normal gas system operations, that this incremental GJ comes from linepack and that linepack is held on the transmission system. The pricing of transmission pipeline imbalances is therefore the fundamental mechanism for establishing the value of gas during the trading period. It is assumed that the distribution systems take all of the gas that they require and effectively remain in balance.

In its initial stages this market is in effect a secondary physical market to allow large wholesale users (including gas fired power stations) to manage their portfolios optimally, allow smaller shippers to access the market without access to upstream gas supply or transmission rights (if they wish) and to optimise system utilisation.

The market is also intended to be a "catalyst" against which other markets are set.

As proposed, the framework requires shippers to make bundled offers of both gas supply and pipeline capacity in order to offer supply into the market. It is already apparent that a number of the retailers in the Eastern Australian system are taking positions for gas supply and utilising that same supply capacity into more than one market. Prior to the opening up of the gas market a retailer had matched supply and transmission capacity into its franchise market. Now, a retailer (and potentially large industrial customers) may have mismatched gas supply and transmission capacity positions into several markets. With the establishment of a pricing mechanism that all shippers are exposed to, the incentive to withhold excess capacity from markets for "strategic reasons" diminishes.

The proposed mechanism does not force any party upstream of the transmission system to be a participant. It would however be logical for an upstream participant to either independently offer supply or deal (long term or day by day) with a party who wishes to bid excess capacity into the market. It would mean that any spare capacity held by the producer would be bid into the market during any particular trading period. The probability of that gas actually flowing would be depend entirely on the price at which it was bid. If the price was not appropriate (ie too high) for the day it will not flow unless it was due to extraordinary circumstances

On any one-day Shippers (like producers) will not have all of their contracted gas supply and transmission positions fully utilised. This is inefficient and this inefficiency would be demonstrated every time the gas market price of gas went above the retailer's marginal price of gas. Logically, if a party could match its excess supply or transmission with the offsetting capacity position it could offer this position to the market. For instance, producers with excess capacity, shippers holding excess capacity under gas supply (and storage) contracts and those holding excess transmission capacity can use the published price as a means of matching these positions and offer it to the market. This may happen in any one of several ways. The key element is that the price established by the wholesale gas market will in effect drive this outcome. This may or may not lead to parties establishing a permanent mechanism to price gas ex plant or a market for pipeline capacity (services). In the mean time it is likely that parties will price gas ex plant by calculating the market price nett of transmission and balancing services.

The market mechanism is not meant to increase risk (in fact the intention is to provide a mechanism to alleviate risk). Parties should be able to protect against market exposures through a range of options including prudent planning, physical hedges, appropriate bidding behaviour, utilisation of services provided by pipeline operators and storage facilities or flexible gas supply arrangements and bilateral and on market trading.

It is intended that the pipeline operators continue to contract their own capacity and services and run their pipelines as they wish. Pipeline operators will be accountable for their operating practices through their transmission agreements.

It is likely that parties capable of providing flexibility in balancing such as storage providers, and pipeline operators will become important to the operation of the market. It is possible that these services may become limited, especially pipeline services, as the pipeline operator's contract more and more pipeline capacity and there is less and less linepack available for balancing services. Over time an auction system or another form of allocation mechanism may evolve to price these services. This may or may not be incorporated directly into the market but should occur as the market participants and service providers believe is best at the time. This in itself may well evolve as an alternate mechanism to the process discussed above, to value pipeline capacity and services independently of gas supply.

The market could (subject to some minor variations in transportation contracts) operate separately from the pipeline operations but it would be expedient for both the pipeline operator and the market operator to work cooperatively to maximise efficiency and simplify the processes.

It is proposed that an independent market responsive body manage the market mechanism. This is discussed under section 5.1.

It is not intended that the establishment of this simple market be confused with the Victorian Gas Market where an independent system operator uses the pool market to dictate the operations of an open access transmission system.

5.3.2 Security of Supply

Increasing and substantial interconnection between gas markets is a key driver for the development of gas markets in Eastern Australia. Interconnection means that States are no longer

bound by single points of supply or transmission. Having alternate points of supply and transmission has significantly enhanced security of supply. It does however mean that States are now also exposed to supply shortfall events in other States. When this occurs gas that may otherwise have only ever been available to one region is now required over a far broader area, perhaps reducing supply in the "natural" market or (under this market mechanism) significantly increasing prices due to the scarcity of the gas or transmission capacity. In extreme circumstance when the shutdown of essential services and /or gas distribution networks is required there will need to be some coordination between States as to how this should occur, where and when.

In a fully integrated system it is no longer appropriate to parochially allocate gas supply, but rather have a well-understood and transparent market mechanism for allocating gas where it is most desperately required. This will need to be agreed by the States and industry. This is further addressed in Sections 5.3 and 5.4.

5.3.3 Transparency

The proposed market mechanism seeks to match as closely as possible the physical capabilities of the gas system as it currently stands. With the exception of the GasNet system in Victoria most of the transmission systems in Australia tend to operate from day to day. They rely on initial nominations to configure the system for the day and on linepack to manage daily imbalances. Adjustments are made to the linepack position the next day if it is too far out of balance. A market mechanism built around these concepts, encouraging shippers to balance. Pricing the imbalance provides transparency and seeks to maximise market efficiency.

5.3.4 Ease of Transactions

Where possible the proposed market mechanism should "piggy back" on existing processes. For instance nominations to pipeline operators and producers are already required. The process for the development of the D-1 gas supply demand curve should be timed so that the parties who are to provide the gas supply know the preliminary nominations prior to the time they need to nominate to producers/pipeline operators.

It is also a current requirement to have gas injections allocated at the injection point and for network operators to allocate supply back to the city gate for individual wholesale shippers. These processes should be incorporated.

It would be appropriate (if possible) to align the processes (ie nominate on a coordinated basis for the different markets) for the whole system (SE Australia), but it is not absolutely necessary.

5.3.5 Minimum Cost

Unlike the VENCorp/GasNet model, the proposed mechanism does not utilise an independent transmission system operator nor should it require a complex market-clearing engine. The VENCorp/GasNet model not only creates the supply demand curve but determines how the system should be operated. It is not anticipated that large transmission systems require this level of complexity. This will be the pipeline operator's responsibility and will be managed by transmission contracts.

It is anticipated that the management of this mechanism should be relatively simple and cost effective. Further work will be required to determine if this is the case.

5.3.6 Minimum Regulatory Shock

A key principle is for the market to evolve to meet the needs of the industry. This will only occur if the mechanism is a fair as possible to all parties and that all parties recognise that no mechanism will suit any participant perfectly.

The gas industry has been underwritten by a series of long term gas supply and transmission agreements. It is not appropriate to require parties to make major commercial variations to these agreements. At the time they were signed significant effort would have gone into the allocation of risk and reward. The market mechanism aims to leave the risk/reward balance pertaining to any standard supply/transmission agreement unchanged. It may infringe on some of the operating parameters with respect to timing of nominations. If parties do not wish to amend their agreements it may be possible to work around these issues. Subsequent agreements will be negotiated in the light of any developing market.

5.3.7 Separate markets

This mechanism is not intended to be a centrally managed national gas market but rather a gas market framework that can be applied nationally. The concept is to develop a series of pricing points that will influence the flow of gas. If these concepts are properly implemented the markets will logically be both physically and commercially linked such that circumstances in one market can drive outcomes in other markets.

The Victorian gas market will operate separately but has sufficiently similar characteristics that it should be compatible.

Appendix 2

6 Current Practices

Any gas market developed for Australian markets should reflect these generic pipeline operating principles and permit current practice where they provide a flexible and secure service. Where certain practices may impede the efficient and safe operations of the system the gas market needs to encourage responsible practice.

- Substantial gas users and wholesale gas buyers purchase gas supply from producers and storage facilities on standard industry terms and conditions. These terms and conditions principally relate to maximum gas take in a period(s), priority of service, requirement to balance over the period(s), operational parameters such as nominations and management of emergencies, and the price of the service.

- In order to move the gas to market, wholesale buyers contract gas transmission services from transmission pipeline owners. These too have standard industry terms and conditions that are in effect similar to those of the producers.

The standard industry terms and conditions dictate the daily operations of the gas system:

- Nominations for gas supply and transmission are made in a variety of timeframes from months, days and hours in advance of the required flow period. These become progressively more accurate and commonly, more binding on all parties.

- Nominations against which the system will operate tend to be made in the middle of the prior gas day (say midday on the prior day) for a gas day to commence the following morning (say 9:00am). These are subsequently confirmed by producers/shippers and are generally considered firm. Commonly, adjustments are made to these nominations right up to the commencement of the gas day within agreed parameters, or on a reasonable endeavours basis.

- Pipeline operators constantly monitor their pipeline system operating pressure. Immediately prior to the gas day pipeline operators will look at the nett imbalance position on their pipeline. The nett imbalance position is the difference between the gas injected into the system over a defined period and the gas withdrawn from the system over the same period. At this time they will decide whether additional gas (in excess of forecast gas demand for that day) needs to be added to the system to replace gas taken the previous day by shippers in excess of the shipper's nomination. Alternatively, if shippers have taken less gas than has been ordered and had supplied by producers there may be an excess of gas in the system.

  Immediately prior to the gas day, pipeline operators may request that shippers increase or decrease their gas supply orders (or decrease / increase demand) to bring the pipeline back into balance. These circumstances can arise from parties operating within their contract positions. The situation can be significantly exacerbated if parties act outside of their contracted positions.

- Once the gas flow for the day has been agreed, the gas day commences. Under exceptional circumstances operational flow orders may be required within the day. This is where the pipeline operator requests shippers to adjust gas supply into the pipeline or more commonly

reduce offtake. Events requiring operational flow orders can occur for a number of reasons but are generally required when a shipper is operating outside of its agreed parameters or a significant event has affected gas supply or pipeline operations. Otherwise parties will inject gas and withdraw gas as per the nominations.

- Some gas producers and pipeline operators allow for renominations during the course of the gas day. This allows buyers and shippers to maintain system balance where their anticipated demand is higher than anticipated. Renominations generally occur within agreed parameters or on a reasonable endeavours basis.

  Inaccurate forecasting is generally brought about by weather conditions being substantially different to those anticipated (increased heating load in winter, increased gas fired power load for air conditioning in summer), or large customers changing their running schedule for any number of reasons. For example, gas fired power stations may be called into service at short notice with the breakdown of other generators in the system. In the case of over supply, pipeline services and storage facilities can be utilised by shippers to take their excess gas from the system.

- Pipeline operators routinely offer services to assist shippers in managing variations in demand. This generally takes the form of a nomination tolerance, or short term pipeline storage services known as park and loan arrangements and authorised overruns. This is where the pipeline operator effectively allows shippers to utilise the linepack on the pipeline system to manage its imbalances. This service tends to be more flexible on pipeline systems where the total system capacity is not being fully utilised. On pipeline systems that are more fully utilised the ability to offer these types of services may be reduced. Services are provided for a fee.

- Injection points into gas transmission pipelines often have more than one party with injection rights during the gas day. In these circumstances those parties with rights to inject need to agree an allocation mechanism between themselves and the injecting producer so that on any one gas day all gas injected from all injection points is allocated to shippers.

- Withdrawal points from gas transmission pipelines often have more than one party with withdrawal rights during the gas day. Withdrawal points are generally network city gates but can be individual customer outlets. In these circumstances those parties with rights to withdraw gas need to agree an allocation mechanism between themselves and the network operator so that all gas withdrawn from all withdrawal points is allocated to shippers on any gas day.

  Allocation is less simple at network city gates as customer meters down stream of the city gates are not read every gas day. It is common practice for mass market customers (those whose meters are not read every day) to use gas in a relatively uniform and predictable manner, generally related to weather conditions. It is therefore possible for algorithms to be developed to appropriately allocate gas to individual customers and hence allow gas to be allocated at the city gate to individual shippers on a daily basis.

- The capacity to allocate all gas at the injection and withdrawal points for all shippers allows each shippers daily imbalance to be calculated at any point (or on any pipeline) by the pipeline operator. This data is then applied to the gas transmission contract to ensure that all rights and obligations have been met or to determine what remedy is required. In making this

calculation the pipeline operator will also take into account what short term services may have been requested or purchased prior to, or during the operating period to remedy any potential breaches.

- As noted above, if any adjustments need to be made to the linepack balance for the following day, these are made after the calculation of the imbalance position. Maintenance of an optimal linepack position allows for the most efficient performance of the transmission system.