Consultation Paper

Concept Design for Wholesale Gas Market

March 2006

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1. Introduction

1.1. Purpose

The purpose of this consultation paper is to give stakeholders the opportunity to review and comment on options for a wholesale gas market in New Zealand. This paper offers a series of options, described at a concept level and qualitatively evaluated against a set of criteria agreed between Gas Industry Co and the Wholesale Markets Working Group ("WMWG" or "the Group")[1].

Submissions will be used to assist in selecting an option (or options, if more than one) for detailed design which will then be the subject of further consultation.

1.2. Background

The Government Policy Statement on Gas Governance (GPS) states, inter alia, that the Government expects the Gas Industry Co to develop and submit to the Minister of Energy for approval:

> "*the development of a secondary market for the trading of excess and shortfall quantities of gas*."

Gas Industry Co has been working with WMWG and its on this issue, with support from consultants[2], and this has culminated in the current paper. The paper offers five options and discusses their relative merits in the context of the New Zealand situation. That discussion has benefited greatly from the input provided by members of WMWG who worked to ensure that the conclusions the paper draws are soundly based.

To take any of these options further would require detailed market design, a step that requires significant commitment of resources. Prior to taking that step it is important to reduce the number of options and the paper does this by evaluating each of the options against a set of common criteria. Because the options have been developed to only a concept level, the evaluation does not include a cost-benefit analysis in monetary terms as, for the reasons discussed in section 5, that would be premature at this stage. The analysis presented in this paper uses a qualitative evaluation to comprehensively eliminate a number of the options.

1.3. Submission Requirements

The Gas Industry Co invites submissions on this consultation document, preferably including answers to the specific questions contained in the document, by 5:00 pm on Friday, 28 April 2006. Please note that submissions received after this date may not be able to be considered.

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[1] The Wholesale Markets Working Group comprises eleven members, of whom nine are from the gas industry and the remaining two are independent (including the chair). Membership and further information on WMWG can be found on the Gas Industry Co website www.gasindustry.co.nz.

[2] This work has been largely driven by seed papers from NZIER (with input from Concept Consulting) that comprise the basis of this document.

The Gas Industry Co's preference is to receive submissions in electronic form (Microsoft Word format and pdf) and to receive one hard copy of the electronic version. The electronic version should be emailed with the phrase "Submission on Wholesale Market Design" in the subject header to:

info@gasindustry.co.nz

and one hard copy of the submission should be posted to the address below:

Gas Industry Company Limited
Level 9, State Insurance Tower
1 Willis Street
PO Box 10 646
Wellington
New Zealand

Attention: Ian Dempster

Tel: +64 4 494 2467

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The Gas Industry Co will acknowledge receipt of all submissions electronically. Please contact Ian Dempster if you do not receive electronic acknowledgement of your submission within two business days.

Submissions should be provided in the format shown in Appendix A. The Gas Industry Co values openness and transparency and, therefore, submissions will generally be made available to the public on the Gas Industry Co's website. Where submitters intend to provide confidential information as part of their submissions we ask that you discuss that with Gas Industry Co prior to lodging the submission.

2. Regulatory Context

This section provides information on the relationship between the Gas Act 1992 ("Act"), the Government Policy Statement on Gas Governance (GPS"), and the Gas Industry Co which gives rise to this work stream.

2.1. Gas Act

Section 43F of the Act empowers the Minister to make recommendations on regulations or rules in respect of wholesale market, processing facilities, transmission and distribution of gas. With respect to wholesale markets, s43F(2) states:

> "*(a) providing for the establishment and operation of wholesale markets for gas, including for—*
>
> *(i) protocols and standards for reconciling and balancing gas;*
>
> *(ii) clearing, settling and reconciling market transactions;*

(iii) the provision and disclosure of data and other market information;

(iv) minimum prudential standards of market participation;

(v) minimum standards of market conduct;

(vi) arrangements relating to outages and other security of supply contingencies"

2.2. GPS Objectives

The Government's overall policy objective for the gas industry is:

> "*To ensure that gas is delivered to existing and new customer in a safe, efficient, fair, reliable, and environmentally sustainable manner.*"

The GPS also specifies the following specific outcomes that the Government is seeking:

> "*(a) The facilitation and promotion of the ongoing supply of gas to meet New Zealand's energy needs, by providing access to essential infrastructure and competitive market arrangements;*
>
> *(b) Energy and other resources are used efficiently;*
>
> *(c) Barriers to competition in the gas industry are minimised to the long-term benefit of end-users;*
>
> *(d) Incentives for investment in gas processing facilities, transmission and distribution, energy efficiency and demand-side management are maintained or enhanced;*
>
> *(e) The full costs of producing and transporting gas are signalled to consumers;*
>
> *(f) Delivered gas costs and prices are subject to sustained downward pressure;*
>
> *(g) The quality of gas services and in particular trade-offs between quality and price, as far as possible, reflect customers' preferences;*
>
> *(h) Risks relating to security of supply, including transport arrangements, are properly and efficiently managed by all parties;*
>
> *(i) Consistency with the Government's gas safety regime is maintained; and*
>
> *(j) The gas sector contributes to achieving the Government's climate change objectives by minimising gas losses and promoting demand-side management and energy efficiency.*"

The GPS sets out specific expectations that the Government has with respect to Gas Industry Co developing wholesale market arrangements. At paragraph 9, the GPS states:

> "*The Government expects the industry body to develop and submit to the Minister of Energy for approval proposed arrangements, including regulations*

and rules where appropriate, providing for effective industry arrangements in the following areas.

Wholesale Markets and Processing

- *The development of protocols and standards applying to wholesale gas trading, including quality standards, balancing and reconciliation.*
- *The development of a secondary market for the trading of excess and shortfall quantities of gas.*"

2.3. Consultation Requirements

Before making a recommendation to the Minister, Gas Industry Co is required to follow the procedure specified in section 43N of the Gas Act 1992, which states:

"*(1) Before making a recommendation to the Minister for a gas governance regulation [or rule], the [Gas Industry Co] must–*

(a) seek to identify all reasonably practicable options for achieving the objective of the regulation [or rule]; and

(b) assess those options by considering–

(i) the benefits and costs of each option; and

(ii) the extent to which the objective would be promoted or achieved by each option; and

(iii) any other matters that the [Gas Industry Co] considers relevant; and

(c) ensure that the objective of the regulation is unlikely to be satisfactorily achieved by any reasonably practicable means other than the making of the regulation [or rule] (for example, by education, information or voluntary compliance); and

(d) prepare a statement of the proposal for the purpose of consultation under section 43L(1).

(2) The statement of the proposal referred to in subsection (1)(d) must contain–

(a) a detailed statement of the proposal; and

(b) a statement of the reasons for the proposal; and

(c) an assessment of the reasonably practicable options, including the proposal, identified under subsection (1); and

(d) other information that the [Gas Industry Co] considers relevant.

(3) The [Gas Industry Co] is not required to comply with subsection (1) if it is satisfied that the effect of the recommendation is minor and will not adversely affect the interests of any person in any substantial way."

The consultation under section 43L(1) requires Gas Industry Co to:

- Consult with persons that the recommending body thinks are representative of the interests of persons likely to be substantially affected by the proposed regulation;
- Give those persons the opportunity to make submissions; and
- Consider those submissions.

It should be noted that this consultation paper does not contain a cost/benefit analysis in monetary terms; the conceptual nature of the choices at present does not allow this. However, monetary costs/benefits are only one aspect of the overall evaluation of the options. Of greater importance at this stage is the identification of efficient and practicable options, i.e. clauses 43N(1)(a) and (b)(ii) above.

Gas Industry Co considers that the comprehensive qualitative evaluation contained in this paper is adequate for the purpose of eliminating a number of options. This will allow for a more efficient next stage to this work stream, involving the detailed design of one or a limited number of options and then a second round of consultation on the detailed design. The information generated by the detailed design will make it practical to undertake a cost/benefit analysis at that stage.

3. The Need for a Gas Market

At present there is no organised facility in place in New Zealand to enable formalised gas trading, so any trading that does occur is arranged privately by individual participants, with the terms and conditions typically confidential to the contracting parties.

This paper investigates mechanisms that could be made available should a more formal or organised structure for trading be deemed desirable. It divides the market into two parts, reviewing the methods for establishing long-term contracts and options to enable participants to trade when they have a short-term deficit/excess of gas. It also evaluates the outcomes associated with persistence of arrangements similar to the status quo (i.e. direct bilateral trading), as it is not necessarily the case that these arrangements are less efficient just because they are not formal or transparent to the market. In this paper, the short term is taken to mean up to one year ahead. Anything of a duration greater than one year is defined as a long-term contract.

The design work is motivated firstly by the government's instruction to the Gas Industry Co, but more fundamentally by the increasing complexity of sourcing gas from one of many small fields, rather than one large field. The possible need for new short-term arrangements to allow flexibility in the face of take-or-pay provisions in long-term contracts is also a key driver.

The majority of gas is currently traded under long-term contracts. In recent times the long-term contract market has been dominated by contracts with 'take-or-pay' provisions that require the buyer to pay a relatively high fixed charge (typically in the region of 70% to 80% of the total cost) regardless of the volume of gas actually consumed in a period[3]. In addition, contracts typically require users to buy a fairly flat profile – partly driven by

[3] In some instances these have been superseded by capacity contracts with separate uplift charges.

physical constraints on production and the producers desired supply profile. For example, some contracts allow for an uplift of around 20% in winter, but the difference between summer and winter load suggests demand for an uplift of around 60%. These contract terms are being passed from wholesalers to major users.

The effect of these take-or-pay provisions and flat contract profiles is that at times users may find themselves paying for volumes of gas that they have no ability to use, perhaps because they are a retailer supplying a peaky residential load, or because their plant has a substantial outage. As a result, on the demand-side there is likely to be a desire for arrangements that allow for flexible demand profiles. From the perspective of ensuring that gas is put to its highest value use in any given period, it is desirable that this gas is able to be on-sold. Conversely, it is likely to improve efficiency if those parties who have a peaky load or short periods of high demand were able to buy gas specifically for those periods rather than requiring them to buy that high volume of gas when it is not required.

The separation of sales by producers and a secondary market in the syntax of the GPS suggests that it was intended that the arrangements for these groups could be separate. Gas is a commodity, it makes no difference to the final product (either physically or in terms of how it arrives at its destination) whether the seller is a producer or another gas industry participant. Given this, there is no reason to distinguish between sales by producers and resellers. A secondary consideration is that both the number of participants in the market and the level of liquidity anticipated are low, which reinforces the benefits of considering all sales together.

The wholesale market is distinguished from the retail market for the purposes of the trading mechanisms considered here. When gas is traded on the high pressure transmission system it is considered a wholesale trade, as opposed to any transactions that may occur on the lower pressure, distribution system.

4. Objective

Based on the reasoning outlined in section 3, the objective of this work stream is: to develop workable and efficient arrangements for the trading of gas (including regulations and rules where appropriate) that satisfy both government and industry.

Q1: Do submitters agree with the objective defined for this work stream? If not, how and why would you change it?

5. Evaluation Criteria

In order to determine the suitability of various mechanisms for gas trading in New Zealand, a number of evaluation criteria were developed. These criteria seek to identify the relative risks and merits associated with each mechanism, taking into account the characteristics of the New Zealand market. The criteria are listed below and described in more detail in Appendix 2:

- **Efficiency**: This criterion considers the extent to which resources are efficiently allocated over time and the extent of any resource waste inherent in a solution. The key question is whether the option being considered distorts the incentives faced by parties to invest, or undertake risk mitigation activities.
- **Information availability:** This criterion involves determining the extent to which the proposed approach ensures high-quality, accurate information is equally available to all parties in an equitable, timely manner. The extent to which the approach facilitates the development of appropriate risk management skills on the part of participants is also considered.
- **Contract availability and competitive effects:** This will require consideration of the likely effect of the proposal on the volume and type of contracts offered and parties' risk exposure. One of the motivators for the government's intervention in the gas sector is to ensure that the benefits of competition are delivered to consumers to the extent possible.
- **Regulatory certainty:** To what extent does the proposed approach meet the objectives of the GPS and limit the risk of future (unknown) changes in regulation?
- **Administrative and compliance costs**: To what extent does the proposed approach increase or reduce the costs associated with trading?
- **Practicality**: Is the proposal able to be implemented, what is the risk of only partial implementation occurring? This will require (*inter alia*) consideration of international experience and the structure of the domestic energy market.
- **Equity**: Will the proposal treat participants equally, or to what extent will it yield differential treatment of parties by size, by position in the supply chain, by reference to historical information or by the type of use to which the gas is put.
- **Scalability**: The New Zealand gas market is currently limited in scale, this criterion considers the appropriateness of the solution to the current market size and whether there are any barriers to expansion of the approach being considered to deal with a more complex or larger market.

Section 43N of the Gas Act 1992 (as amended) requires that, prior to making a recommendation to the Minister of Energy for a gas governance regulation, an assessment of all the reasonably practicable options should be undertaken including consideration of 'the benefits and costs of each option'. We are not at the stage of proposing regulatory arrangements, therefore this consultation paper does not contain a monetised cost-benefit analysis of the options for a formal wholesale gas market.

Rather this paper outlines at a conceptual level the options that are available should a more formal market structure be deemed desirable. The evaluation framework described above represents a form of non-monetised cost-benefit analysis. Any attempt to quantify the costs and benefits would be premature at this stage; instead an indication of the relative importance of each criterion is provided and the relative score of the options against each criterion is given. This form of analysis is useful in focusing on the practicable options and determining whether additional analysis is worthwhile, or the status quo should be retained. If additional analysis is indicated, the focus can then turn to

the detailed design of these options and quantifying their costs and benefits where possible.

It is also worth noting that the options do not necessarily result in the need for gas governance regulations. An alternative is an industry arrangement; this is discussed further in section 18.1.

> *Q2: Taking into account the conceptual nature of the options at this stage, do submitters agree that these criteria reflect the key measures of suitability of a trading mechanism in the New Zealand wholesale gas market? If not, what criteria would allow a better evaluation of proposed mechanisms?*

6. Gas Market Characteristics

The structure of the gas market and the density of participants in that structure, are key characteristics to be considered in the design of the wholesale market.

Within this, there are a number of key considerations in a New Zealand context:

- **Supply and vertical integration** – the existing market is fairly concentrated in terms of production, with a relatively limited number of organisations involved. This does not necessarily indicate any issues around the level of competition inherent in production, but it will drive, for example, the type of contracts which are offered to buyers in the wholesale market. Similarly, the number of wholesalers is not large – again a factor which will affect other conditions in the market, such as the level of information disclosure and the terms and conditions available to purchasers of gas from these wholesalers. Also, some participants are vertically integrated to different extents, being involved in a number of levels in the supply chain.
- **Contracts** – the nature of the supply side and the demands of downstream users means that the market will likely require long-term contracting in some form to enable both parties to secure or cover their position, and to ensure that incentives are in place for investment to occur. They allow generators, for example, to fix some costs regardless of the upstream structure. These contracts however, are unlikely to be exactly to the buyers' requirements, so such buyers are likely to seek to trade gas to manage their gas position.
- **Demand side participants** – the demand side exhibits a similar lack of density as the supply side, in that the bulk of gas demand is attributable to a relatively limited number of users (large industrials and generators). In 2004, 5% of consumers (those classified as commercial and industrial users) accounted for around 96% of consumption[4].
- **A 'thin' market** – the lack of density in terms of both demand and supply is a natural constraint on the level of trading and liquidity that can eventuate. While being constricted by the depth of trading[5] and resulting liquidity, a more over-arching constraint is size of the New Zealand economy within which the gas

[4] Ministry of Economic Development – *Energy Data File,* July 2005

[5] Both in terms of the volume of trading that occurs, and the number of players.

market operates. The scope of the economy only permits a certain market size; hence there is an effective 'cap' on potential growth in the depth and liquidity in the wholesale market.

- The lack of density in the structure of the market can be contrasted against other jurisdictions with relatively high levels of liquidity in the following table. The scope for growth in the level of liquidity will ultimately be restricted by the size of the potential pool of buyers and sellers.

A more detailed discussion of gas market characteristics in New Zealand and their potential impact on the design of the wholesale market can be found in Appendix 3:.

7. Current Long-Term Gas Trading Arrangements

Contracts for gas supply over one year are currently arranged bilaterally between parties. They typically result from either sales of expected gas production from a new or existing field by a producer, or a purchasing arrangement between a major user and a supplier. In either case the motivation for a long-term contract is similar – the producer is seeking certainty over a level of revenue on which to base its investment decision; the major gas user is seeking certainty over a cost item that may represent a large percentage of its expenditure.

The details of these bilateral arrangements are typically confidential. However, discussions with a range of market participants have yielded some useful generic information.

7.1. Major Users

One common method for major gas users to acquire gas is by issuing a request for proposals or tender for gas supply. Negotiations can then occur to finalise the agreement with the preferred supplier. Industrial users often contract for bundled transmission and gas.

Major users typically hold contracts between 1 and 5 years duration, but there are instances of contracts for longer periods such as 10 years. Recent trends have been to shorter duration contracts being offered by gas producers. This may reflect the level of uncertainty in the market with regard to the overall composition of supply.

7.2. Producers

The New Zealand gas market is a contracts market, rather than a commodity market. In other words, contracts for large quantities of gas for an extended period tend to be entered relatively infrequently. This means (inter alia) that the market is quite inflexible to changing conditions. For example, current contracts were largely set prior to the most recent clarification of the Maui depletion path (and available reserves) in a context of Maui legacy gas contracts which contained price escalation clauses. Moves to gas from other fields saw somewhat of a step change in prices, reflecting the cost of 'new' gas.

In terms of existing contractual arrangements with producers:

- The Maui legacy gas contracts are due to expire in June 2009. Maui legacy gas is contracted to the Crown by the Maui partners, the Crown then contracts with NGC, Contact and Methanex. This arrangement applies to Legacy Gas. Right of First Refusal, or ROFR gas, must be offered first to NGC and Contact but can be sold by the Maui partners to other parties if NGC and Contact do not take up their rights to it.
- Half the output of the Kapuni field is committed to NGC. The rest is sold to parties including gas retailers.
- Pohokura gas is largely committed until 2012. Contact has purchased OMV's entire initial tranche of gas for five years from first production. Genesis has

purchased some of Todd's entitlement, with the remainder being reserved by Todd for Nova Gas and its own electricity generation. Shell has contracted its share of gas to Contact, Genesis, Multi-gas and NGC with most contracts to 2012.

Field owners have in the past employed an auction, a tender or a negotiated process to sell their gas. Recent examples include:

- Sales by Shell of Pohokura gas were by a process analogous to a tender with a 'marketing campaign targeting foundation customers in the lead up to the investment decision for the Pohokura development' (Shell Media Release, May 2004).
- Todd offered McKee and Mangahewa gas by auction (September 2003, media report). Previously the gas had been sold through private contracts. Tender was rejected because of the legal obligations it imposed on the seller.

New sources of gas are likely to be sold under long-term contracts to electricity generators, petrochemical manufacturers and gas wholesalers/retailers. Little uncommitted gas is expected to be offered to the market (for example, most of the Pohokura gas is committed until 2012). This reflects the need by producers to secure buyers in order to support the decision to invest in a field (see below). Supply from a field is typically offered without any transmission; in other words it is sold at an interconnection point with the high pressure gas transmission system..

Sales may be made jointly or by individual owners of the field separately. Joint sales (i.e. by multiple field owners) require agreement on the relevant terms and conditions of sale including price, quantity, rate, specification and liability (and may require Commerce Commission clearance). Separate sale by multiple field owners requires agreement on parameters for the development of the field, including the optimal depletion path (maximum daily, average daily, and annual quantities). Within these parameters each party is then able to sell its share of gas on the basis of independently negotiated terms and conditions. Parties also need to agree measures to address problems associated with separate marketing.

Q3: Do submitters agree with the characterisation of existing long-term contracts outlined in this section, or are there additional important contract features that should be considered?

8. Interest in Long-Term Contracts

Before considering the possible need for a formalised or mandated long-term contract market structure it is important to consider to what extent and why buyers and sellers have an interest in long-term contracts. Clearly, if the interest does not exist then there is no benefit in considering the mechanism by which contracts are formed.

Fundamentally, long-term contracts are used to determine risk-sharing along the gas supply chain. In general, entering a long-term contract will see the seller accept the risk on price (i.e. the buyer is protected from the risk that prices will increase in future), while the buyer accepts the risk on volume (i.e. the seller has a secure volume of sales, and the buyer bears the risk that the volume for which they are contracted does not match their

demand). In contrast, the short-term or spot market does not typically require any specific relationship between the two parties, or impose any significant risk-sharing arrangements.

There are three main theories regarding the demand (by both buyers and sellers) for long-term contracts:[6]

- Institutional economics holds that long-term contracts are used to avoid opportunistic behaviour in deals where there are high levels of sunk investment. The higher the asset specificity, the more likely the asset owner will seek long-term contracts rather than rely on market exchange.
- Industrial organisation suggests that there is a strategic value associated with long-term contracts. The theoretical literature mainly focuses on the value of long-term contracts in terms of either competition or collusion. From a competitive perspective buyers benefit from the existence of long-term contracts since at each contract term additional output is offered. The lower the volume of gas being offered at subsequent opportunities, the lower the incentive for sellers to reduce production and therefore the lower the expected price. This lower price is generally reflected in a lower long-term price. In certain circumstances the literature shows that long-term contracts can help to sustain collusion in the short-term market (this depends upon the disclosure of prices, as discussed below).
- Finally, long-term contracts are linked to infrastructure investment. Long-term investment is secured by forward contracts and other risk management practices.

The level of buyers' interest in long-term contracting will depend therefore on: the premium sought by sellers over the expected short-term price; the extent to which buyers are investing in highly specific assets, or infrastructure; and the extent to which existing buyers are seeking to exclude new entrants from the market (by tying up supply).[7] From a supplier's perspective the key benefits of long-term contracts are likely to relate to securing a revenue stream in the face of a highly specific, infrastructure asset i.e. efficient risk management practices.

The overall prevalence of long-term contracts is likely to depend upon the prevailing supply-demand balance. As supply becomes more constrained buyers will have an increasing incentive to enter long-term contracts to ensure that they can meet the needs of their assets prior to investment.[8]

There is clearly then a need expressed by both buyers and sellers for long-term contracts. While this section has focused on the economics of why there is this need for this form of contract, it is also evident in practice, where long-term contracts are the main manner of trading in the New Zealand wholesale gas market.[9]

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6 See Neuhoff, Karsten and Christian von Hirschhausen *Long-term vs short-term contracts: a European perspective on natural gas*, September 2005.

7 Where gas is being imported there is likely to be an additional security of supply motive.

8 Note that the reverse also holds, as supply increases relative to demand, suppliers will have an increasing incentive to enter long-term contracts at lower prices. At some point the returns available will not be sufficient incentive to invest in increased production. This is how the market equilibrates in the long term.

9 While it could be argued that this in part relates to the difficulty of entering short-term contracts, there is a clear underlying demand for contracts on both demand- and supply-side, which it is anticipated will remain regardless of the short-term contracting mechanism adopted.

Q4: Do submitters agree that there is both a theoretical and practical need for long-term contracts in the wholesale gas market? If not, why not?

9. Methods of Long-Term Contracting

The previous section established the need for long-term contracts. The next relevant question is whether there are issues with the market-derived solution that require explicit formalisation of a mechanism for identifying contractual needs, or potentially even a regulatory intervention.

Section 7 identified the key long-term contracts and contracting methods in New Zealand at present. In general these are auctions or tenders and a form of direct bilateral negotiation (either exclusively or in conjunction with a tender or auction).[10] This section reviews the characteristics of these methods of arranging a contract and the following section evaluates them in more detail.

9.1. Auctions or Tenders

A common method for arranging a contract is an auction or tender. Here we deal with them simultaneously as a tender can be thought of as a form of sealed-bid auction and largely has the same characteristics as an auction from an economic and market outcome perspective. From a legal perspective, we understand that there can be some differences in terms of the obligations placed on the party offering the contract for tender.

There are a number of different forms of auction and they all have slightly different characteristics and outcomes.[11] We have assumed that the most likely form of auction that would be adopted for a gas contract would be a sealed-bid auction with negotiation after the bids are opened. The reason that we have assumed this form of auction is based on observation of the market, where prices for contracts are not disclosed (so the auction cannot be open). From a practical perspective negotiation is likely to be entered after the bids are opened as there are non-price attributes of the contracts that parties are likely to wish to settle such as gas specification and timing. In practice we also observe that contracts for bundles of gas are finalised at different times (such as Shell's Pohokura contracts where it was disclosed that contracts with NGC had not been finalised when the rest of the contracting parties were announced to the market).

The key requirement for an efficient outcome at auction is that there is sufficient competition. In a sealed-bid auction, each bidder independently and privately selects a price, and offers to buy the gas at that price. The bidder offering the highest price wins. In an auction of gas by a producer, it is likely that multiple bidders will "win" depending on the volume of gas available relative to the needs of the buyers and the preferences of the producer in terms of exposure to a single buyer. The different bidders may not pay the same price for their bundle of gas.

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[10] An indirect form of long-term contracting which has emerged relatively recently is where major users gain access to 'equity' gas through joint ventures, or through arrangements with gas explorers.

[11] For a basic introduction to auction form see Milgrom, Paul: "Auctions and bidding: a primer" in *The Journal of Economic Perspectives*, Summer 1989.

A sealed bid auction does not always guarantee an efficient outcome. This is related to bidding strategy. A bidder will try to anticipate the strategy that will be adopted by the other bidders and will base their bid in part on their rivals' assumed valuations. This can lead to an outcome where the party with the lower valuation wins the contract.[12]

In practice there are two features of the gas market that will mitigate against the inefficiency outlined above and increase the likelihood that a bidder will bid their own valuation[13]. First, the information that each participant holds about others' valuations of gas is imperfect. Second, it is likely that the valuation of each participant is at least partly correlated since the uses of gas are limited (on-sale to an industrial end-user, retail or electricity generation). Further an inefficient initial allocation may be resolved through a well-functioning secondary or short-term market.

A sealed bid auction reduces the information that parties hold about the valuation of gas to other participants. This is to the advantage of the seller since, because as argued above a party who has information about their rivals' bidding strategy (or valuation) will adjust their own bid based on this information. Where such information is unavailable, the buyer is more likely to bid their own valuation.

Not publishing prices (even after the event) is also a useful tool against signalling or collusion by the bidders. Collusion can only be maintained where it is possible to retaliate or punish cheaters. Where the final price is unknown it is difficult to detect cheating and collusive agreements break-down more easily. In terms of signalling, buyers are unable to implicitly signal their willingness to pay, and tacitly enter agreements not to push up prices (where there is more than one bundle available) if there is no price signal published.[14]

While price outcomes from previous auctions are not available, there are other sources of information available to a bidder formulating their bidding strategy. For example, the level of market demand relative to supply or industry capacity; the bidder's own success at recent auctions and even prices in other related markets (such as electricity) can provide some information about cost levels and therefore winning bid levels.[15]

9.2. Negotiations

Most auctions in the gas market are followed by negotiations; it is also possible for suppliers to negotiate directly with a preferred supplier. This is unlikely to yield the highest price where there is more than one bidder. However, a party may wish to negotiate with a single counterparty where they have specific requirements that are most likely to be met

12 This is illustrated by Milgrom with the following example: Suppose there are two bidders, one who has a known personal valuation of the item of $101, the other whose valuation is either $50 with a probability of 80% or $75 with a probability of 20%. The first bidder does not know the valuation of the second, but knows its distribution. If the first bidder bids $51 he will win $50 80% of the time (i.e. his valuation less the price). The expected value of bidding $51 is therefore $40. If the first bidder bids $62, he can never win more than $39 ($101 less $62) and will therefore never bid as much as this (bidding $51 yields a higher expected payoff). Therefore, the second bidder will win the item sometimes with his valuation of $75, an outcome that is not efficient, since the first bidder values the item more highly.

13 As opposed to a bid reflecting their expectation of a competitors' bid.

14 Note that collusive behaviour and other forms of price agreement contravene the Commerce Act.

15 Depending on the outcome of consideration of the short-term mechanism, transparent short-term prices may become available which would also provide information upon which to base a bid for a long-term contract.

by the single counterparty. For example, a negotiation may be most efficient and yield the best price where an extension or variation to an existing contract is desired, rather than a new contract. The key to this outcome is that transaction costs associated with a negotiation with a party with which there is an existing relationship will be much lower than running a full tender (this may also be an advantage if there is a shortage of time). This is the trade-off against the possibility of a lower price outcome for the contract itself.

Where there is sufficient competition for an auction, the price is likely to be lower. Consider an item that a party is selling that they value at $100. There are two potential buyers: one values it at $170 the other at $200. An auction will yield a price of at least $170 (if resale is possible the auction will lead to a higher price of $185). If the seller chooses to negotiate with the $200 valuer only, the best price that they can expect is $150.[16]

It is possible that an inefficient outcome will result from a single party negotiation since the offeror has no way to know for sure that they are negotiating with the party with the highest valuation. Benefits could be realised in some cases from single party negotiation though, with the relatively small number of potential counter-parties likely to limit the search costs from negotiation compared to the costs associated with issuing tender or auction documentation.

9.3. Posted Prices

A further option for a long-term contract is to post prices and allow potential bidders to accept or not accept the terms. This would be the outcome of a billboard or platform bilateral type option (see short-term options below for more on platform bilaterals). When goods are not standardised or when market clearing prices are highly unstable auctions are usually preferred to posted prices. The reason for this is that so-called menu costs associated with posting new prices for each (non-standard) product are high, equivalently where prices are highly unstable because of changes in supply and demand the cost of frequent price changes generally rules out posting prices.

It is the case for gas markets that long-term contracts are likely to be non-standard and can be variable in their price. The reason for both these features is largely related to the relative infrequency of contracting. Long-term gas contracts are non-standard since producers generally want to sell unbundled gas at the point of connection to the transmission system. Major users seeking gas contracts may be willing to buy at a variety of locations, but evidence is that to-date most prefer to buy a bundled gas and transmission contract at their specific location. Major industrial users are also likely to want to allow for their plants specific requirements in terms of timing and volume to the extent possible. These specific needs make posting prices impractical.

Posted prices are generally most efficient where there is no shortage of supply, goods are standardised and inexpensive, or the item is storable and the timing of buyer demand varies. In these instances posting prices is generally preferable to individual negotiations because of the high transaction costs associated with individual bargaining.

[16] This example is from Milgrom (1989).

Q5: Do submitters agree that auctions, negotiations and posted prices represent the range of contracting mechanisms available for long-term contracting in the New Zealand wholesale gas market? If not, what other options should be considered? Please provide a brief outline of the suggested mechanism.

Q6: Do submitters agree that the key features of each of the mechanisms are captured in this section? If not, what features have been excluded and what impact would they have on the evaluation of the options below?

Q7: Do submitters agree that posted prices should not be considered further? If not, what features of posted prices have not been considered that lead you to this conclusion?

10. Evaluation of Long-Term Contract Options

Due to the inefficient outcomes associated with posting prices both in terms of the allocation of the gas resource, and the transaction cost associated with posting prices for the range of contracts sought, we have not evaluated this option in detail. Individual negotiations and auctions are considered below against the evaluation criteria established earlier, namely:

- Efficiency
- Information availability
- Contract availability and competitive effects
- Regulatory certainty
- Administrative and compliance costs
- Practicality
- Equity
- Scalability

Table 1 Absolute evaluation importance and evaluation of long-term options

Criteria	Absolute importance*	Auction	Negotiation
Efficiency	H	Higher where a new contract is sought (allocative efficiency)	May be higher where an extension or variation on an existing contract is sought (productive efficiency)
Information availability	M	Neither option enables price transparency	Neither option enables price transparency
Contract availability/ competitive effects	M	Allows new entry, higher level of competition relative to negotiation	Does not facilitate new entry but in certain circumstances may yield the specific form of contract sought
Regulatory certainty	L	No regulation required	No regulation required
Practicality	H	Existing form of contracting, high practicality	Existing form of contracting, high practicality
Equity	M	Treats all parties equally to begin with although post-auction negotiation may yield different outcomes for different participants (this may not be inefficient). May be difficult for new entrants to gain equivalent information based on market signals, rendering them at a competitive disadvantage	Designed to target a single party; therefore not equitable and does not allow entry
Scalability	L	Yes	Yes
Administrative costs	M	High	Low
Compliance costs	M	High	Low
Transaction costs	M	High	Low
Default/dispute costs	M	Specific to individual contract	Specific to individual contract

Note: * Absolute importance in terms of achieving workable and efficient arrangements for trading gas
Absolute rankings are high (H), medium (M) and low (L).

Source: NZIER

Table 1 provides a summary of the performance of the two key options against the criteria established. While there are some clear disadvantages to individual negotiation related to the lack of competition and hence potential for an inefficient allocation; there are also clear advantages where a party has very specific requirements and is relatively price insensitive. It is most likely that these circumstances will arise where a variation or an extension to an existing contract is desired. An individual negotiation offers a low cost option in these circumstances. Importantly, because the parties are free to agree or not to

the extension or variation this option is unlikely to result in a major inefficiency after the effects of lower transaction costs are accounted for.

An auction is clearly the preferable option where there are multiple parties interested in bidding on the same contract. The relevant question then becomes is there advantage to be had in formalising or mandating the terms of the auction. The answer to this appears to be no. The key issues for auction design are:

- Discouraging collusive behaviour.
- Discouraging entry-deterring behaviour.

We have already argued that a common form of auction currently adopted – the sealed-bid auction with post-auction negotiation and no publication of prices – discourages collusive behaviour on the part of bidders because cheating is difficult to detect and collusive agreements are therefore difficult to maintain. Where a major user is seeking bids from potential suppliers, collusion is perhaps less difficult, but depending on the form of auction adopted the risks can be minimised. For example, normal tenders allow for a single round of bidding: so if a party cheats on an agreement there is no opportunity for the cheated firm to retaliate. Price signalling is also difficult in this environment where firms cannot use the first round to signal their intentions.

First-time bidders are also likely to have a better chance in a sealed-bid auction than a standard ascending price (English) auction. This relates to the less certain outcome (and potential inefficiency) associated with the sealed-bid auction. 'Weaker' bidders have at least some chance of winning a sealed-bid auction and are therefore more likely to make an offer. There is some evidence that a sealed-bid auction is also more likely to induce bidders to enter whose intention is solely to re-sell. This is because it may be difficult to profit from on-sale to bidders that have already been beaten in an ascending price auction. The counter-argument to this is that because prices are not revealed, it is relatively costly for new entrants to obtain information about the market and small entrants in particular may be deterred by the sunk cost necessary to enter the market.

From the auctioning party's perspective, there is some evidence that bidders are less likely to form consortia in sealed-bid auctions than open auctions. This will increase the level of competition, to the benefit of the auctioning party.

There is no evidence that enforcing a different form of auction would yield an increase in efficiency of outcome, or would make collusive behaviour less likely. Competition law plays an important part in ensuring efficient auctions in a small market such as the New Zealand wholesale gas market and can reinforce the minimisation of collusion. The importance of this role has been seen recently in the Pohokura joint selling determination (and re-determination).

From the perspective of enabling entry a more transparent market would assist. However, it is not apparent to what extent entry is really deterred by the cost associated with information collection. In any event, other potential options exist to assist new entrants to discover relevant information, such as increasing the transparency of short-term contract prices (as discussed elsewhere in this paper).

Finally, it is important to note that while there is some feeling that the form of long-term contracts currently offered unduly advantages the gas seller, the balance of favour is likely to change over time (earlier in the life of the Maui field, for example, buyers arguably had an advantage as supply was plentiful). It is also instructive to note that the features of long-term gas contracts in New Zealand are similar to features that were seen in the European markets until recently. Specifically these are: a high percentage of take-or-pay clauses (typically 80% in Europe, recently reported as 70-80% in New Zealand); a bar on resale except to final consumers (this is a feature of some contracts with major users, and may be an impediment to the efficient allocation of gas); restrictions on the percentage of uplift available above the base amount contracted (typically in Europe and New Zealand these clauses allow demand to 120% of the contract volume. In the case of Pohokura contracts, there is no ability to take over the contracted volume). The liberalisation of the European gas market has seen these clauses become less prevalent. Similarly it could be expected that over time, the clauses in New Zealand contracts alter to suit the market conditions.

In conclusion, there is no apparent net benefit to be gained from mandating the type of mechanism, or the form of auction that can be used to negotiate long-term gas contracts. It is likely to be more fruitful to focus on enhancing transparency of price information to non-participants through short-term trading.

Q8: Do submitters agree with the evaluation of the options outlined above? If not, why not? Please explain what your argument would mean for the conclusions.

Q9: Do submitters agree that there is prima facie no net benefit to be had from formalising or mandating the form of auction by which long-term contracts are established? If not, what benefits of formalisation or mandating, or costs of the existing auction form have not been accounted for?

11. Potential Short-Term Trading Mechanisms

This section looks at potential mechanisms for the short-term trading of gas in New Zealand. In this context, the short term is taken to mean up to one year ahead.

Five trading mechanisms are initially considered as options for developing a market for short-term gas trading by producers and re-sellers. These reflect mechanisms utilised in other jurisdictions and other sectors of the energy industry, and include one which represents arrangements similar to the status quo - direct bilateral trading. The potential short-term contracting mechanisms are outlined below and summarised in Figure 1.

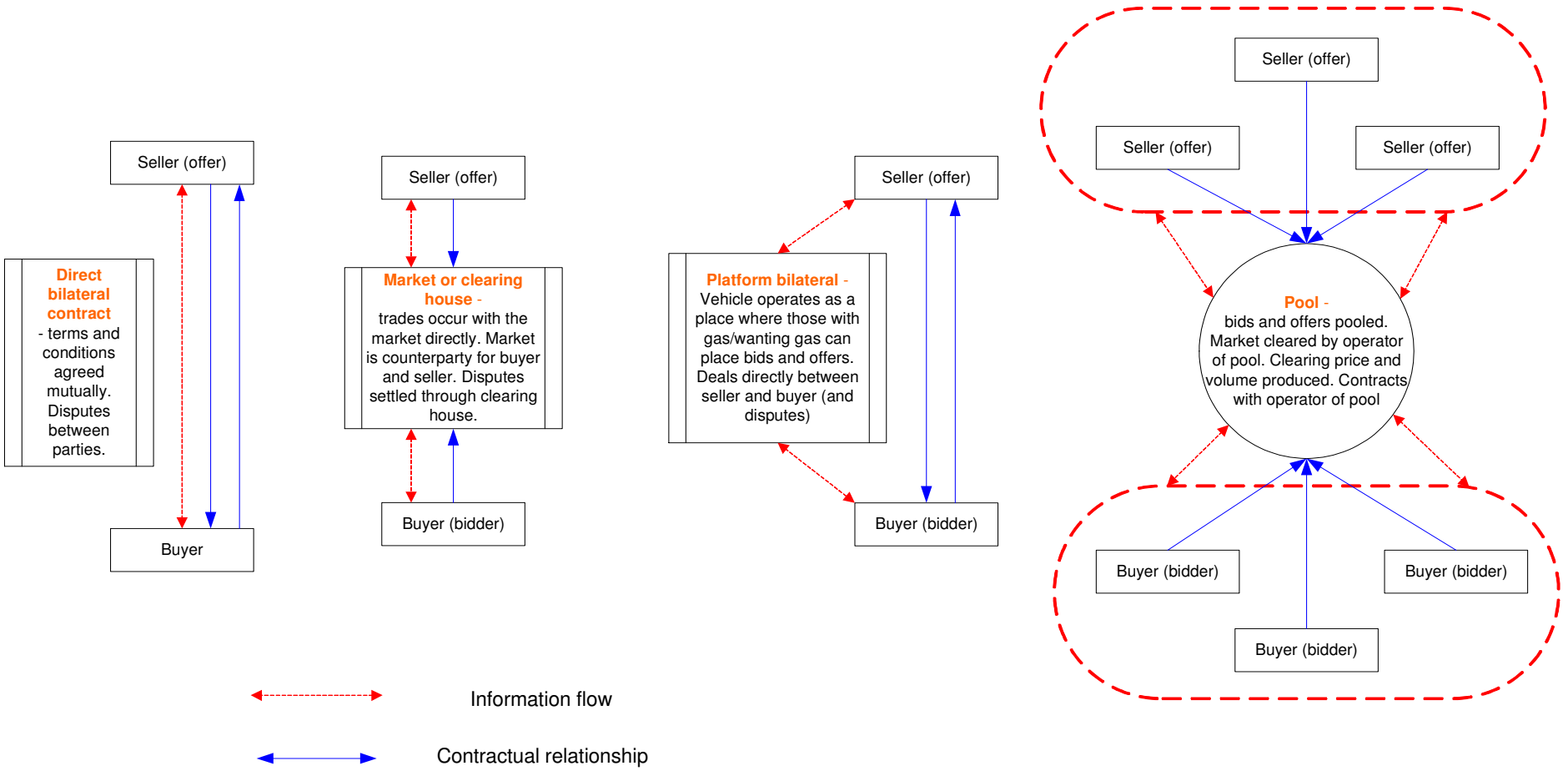
- **Direct bilateral** – this is the form of trading that is currently available to participants. Put simply, it is open to a party who wishes to buy (or sell) gas to contact other participants individually to find out whether they have gas available and the price at which they would be willing to trade. Parties negotiate terms on a contract-by-contract basis (although we understand that some of the larger participants have standing arrangements relating to the terms of such agreements).
- **Platform bilateral** – like the current arrangements, contracts are agreed between two individual parties. The distinction between the platform bilateral and the direct bilateral is that an organised platform is provided that allows parties to easily and cheaply signal the availability of a quantity of gas to sell (or their desire to buy) and the price. The platform would allow participants to simply select a contract to which they wished to become the counter-party. Both parties would then be informed of the obligation, and settlement would occur between the parties. Buying a large quantity of gas could necessitate entering a number of separate contracts.
- **Net pool** – in a pool market all bids and offers for contracts for gas for a given period are delivered to a market operator. The market operator 'stacks' bids and offers based on price and derives a market clearing price. The market operator then informs those participants who have been successful of the quantity they have cleared (i.e. bought or sold) and the clearing price. A single price is derived for all trades; buyers and sellers are not individually matched. For sellers the clearing price is either the price at which they offered gas or a higher price; buyers pay either the price they bid or a lower price. Settlement occurs with the pool. In a net pool, only gas for short-term contracts goes through the market; all gas that is on a long-term contract is dispatched under existing arrangements.
- **Gross pool** – a gross pool operates in an identical fashion to a net pool, except in a gross pool all gas is transacted through the market. This would involve all producers offering gas at a price, regardless of whether it was already contracted under a long-term arrangement. Similarly, all buyers would have to indicate the total quantity they required for each period, rather than only the 'extra' required above their contracted amount. It would be possible either for all volumes demanded to clear (so buyers would not be required to put in a bid price), in a similar way to the electricity market, or for buyers to enter a price and trades to be cleared by stacking bids and offers as outlined above.

- **Clearing house** – a good example of the clearing house model is a stock exchange. In this option, buyers and sellers contract with the clearing house rather than directly with each other. The clearing house sets the price for the buyer depending on its ability to purchase gas from sellers. It is possible to consider a clearing house to be synonymous with a neutral broker aggregating gas contracts for on-sale, and could potentially be on gross or net volumes. The risk sits with the clearing house in terms of default on individual contracts.[17]

Q10: Do submitters agree that the mechanisms listed above cover the range of options for short-term trading mechanisms in the wholesale gas market? If not, what other mechanisms are available?

[17] Although participants to the clearing house still bear a residual risk including the possibility of default by the clearing house.

Figure 1 Variations on gas contracts



Source: NZIER

12. Key aspects of the short-term trading environment

Two of the issues that were considered fundamental to the design of the mechanisms were whether they required compulsory participation or could be voluntary; and whether it would be necessary to know the identity of the party on the other side of the trade. Table 2 sets out the capability of each of the five trading mechanisms in terms of these two issues.

Table 2 Trading mechanism – matching possibilities

	Anonymous	Known counterparty	Compulsory	Voluntary
Direct bilateral	N	Y	N	Y
Platform bilateral	N	Y	N	Y
Net pool	Y	N	N	Y
Gross pool	Y	N	Y	N
Clearing house	Y	N	N	Y

Source: NZIER

12.1. Anonymity

Both forms of bilateral contracts (i.e. direct and platform trading) require that the counterparty to the contract is identified *at some point*. For a direct bilateral, clearly the counterparty is always known, as the instigator of the contract searches amongst its contacts to find a party willing to trade. For platform bilaterals the trade can be confirmed *prior* to the identity of the counterparty being revealed, but in order to settle the parties must know who they are trading with, this is also vital information in the event of default.

There is some advantage to the parties not knowing the identity of the counter-party prior to the trade being confirmed. This largely relates to ensuring that there is a level playing field, and that parties cannot discriminate between potential counterparties. This will assist in encouraging competitive outcomes.

In the current market some participants are thought to be less desirable as counterparties, this relates to their risk profile.[18] The disadvantage to anonymity of trading is that this information on risk profile cannot be taken into consideration by parties when agreeing a price, unless alternative signals of risk are introduced.[19] The other disadvantage to anonymous trading is that it opens the risk that parties may trade with themselves for the sole purpose of making the price appear higher (perhaps to cement an off-market

[18] Risk profile may relate to financial soundness, access to physical resources, experience in the market, or more generally to the risk of behaviour that imposes a cost on the other party – including propensity to enter disputes.

[19] See section 14.1 for additional information on risk profile and how to signal risk in an anonymous market.

contract). This is relatively simply dealt with by ensuring that the market rules do not allow participants to buy their own contracts.

In a pool market the counterparty is never known. Indeed in a pool market gas may be supplied by many parties to a single buyer or vice versa. The pool mechanism removes the need to know the identity of the counterparty as the pool operator invoices and pays participants, and defaults are handled through the pool rather than between individual parties. Participants effectively contract with the pool under the rules by which the pool operates. Despite not knowing who the gas is supplied by, it is important to recognise that all members of a pool are known to each other, and that the pool mechanism effectively spreads the risk and cost associated with default across its participants.

Using a clearing house mechanism, the counterparty for each contract is the clearing house. This means that the clearing house bears the risk. From the gas industry participant's perspective once they are satisfied that the clearing house has prudent risk management policies and procedures in place, there is no need to discover any details about the contractual chain for a specific trade.

12.2.Compulsory Participation

Of all the trading mechanisms suggested, only the gross pool requires compulsory participation. The reason for this is that all gas – whether already contracted or not – has to go through a gross pool by definition. Despite this, clearly it is still open to parties to enter 'side' contracts that would operate as a hedge against the pool price (having a similar effect to existing long-term contracts).

Establishing a voluntary mechanism has a number of advantages over requiring participants who wish to trade to use a particular platform. The principal advantage is that it allows competition among types of trading. This in turn engenders increases in efficiency as parties seek the method of trading that balances costs and benefits. If it turns out that some other method of trading dominates the market, then the trading platform can be evaluated to determine whether it should be adapted or discontinued.[20] Having a standardised market brings advantages in terms of lowering the costs of search and negotiation, but at the expense of less complete risk mitigation. Hence even if the best trading mechanism were implemented, parties may choose to occasionally trade outside the established mechanism when their risk management needs do not match the arrangements available through the market.

A secondary reason for a voluntary mechanism is the difficulty in policing a compulsory mechanism. Unless *all* gas has to go through the mechanism *and* it is possible to measure whether this occurs (as for the gross pool), it would be costly to prevent cheating. For example, a central register would be required that set out which parties had access to gas under long-term arrangements.

The key advantage of a compulsory mechanism is that liquidity is maximised by ensuring that all trades occur in a single manner. This assists in maximising competition for specific tranches of gas.

[20] Any evaluation of the platform should take into account the time that may be required for participants to become comfortable with a new mechanism. A learning period should be allowed before a judgement is made about the preferred manner of trading.

Q11: Do submitters agree that the analysis above accurately reflects the applicability of anonymous/known counterparty and compulsory/voluntary participation to the mechanisms identified? If not, what relevant factors were not identified?

13. Market Characteristics

In order to meet the needs of market participants as far as possible, one of the key requirements of the gas industry is that the mechanism that is developed is practical given the physical constraints in the New Zealand gas industry, and that it is appropriately sized to the current environment but capable of expansion should market circumstances evolve. This section provides a brief overview of the market characteristics that will influence the design of the trading mechanism (more detail is in an appendix). It concludes by providing a brief check of the mechanisms identified in section 6 against the market characteristics.

- Concentrated supply – this will limit the types of contracts typically made available to buyers and will limit parties' willingness to disclose information about prices.
- Substantial investment by both producers and users – bringing gas to the market requires substantial investment and gas is often used in large plant, this means that parties will want to ensure they can access long-term gas contracts prior to investing.
- Concentrated demand – there are a relatively small number of users who purchase gas in substantial quantities. This will limit the number of participants in any market (although not necessarily its competitiveness). This is in part a function of the size of the economy and the New Zealand market should not be expected to grow substantially in liquidity regardless of the mechanism instituted.
- Contract inflexibility – as discussed in section 0, while the Maui contracts have in the past ensured a high level of flexibility was available to users, new contracts can require fairly flat profiles and in some cases feature take-or-pay obligations in the order of 70-80%. On the demand side there is likely to be a desire for arrangements that allow for flexible demand profiles as there is typically variation in demand between seasons, within seasons, between days and within days. A key constraint on the liquidity of any short-term market is that the profiles of buyers' load is relatively similar (most is weekday and winter peaking).
- Logistics of production and transmission – the wholesale market design must recognise the current physical and contractual management of the system, while not being constrained if efficiency would be enhanced by altering that management.
- Metering and information availability – reconciliation can take several months and may constrain parties' ability to manage their short-term needs. This is not an issue at welded points on the Maui Pipeline where shippers are assumed to take their nominations and the welded party is responsible for any imbalance. This means that shippers could trade their nominations. Shippers on the NGC system are unlikely to be able to trade as easily. Allocation is managed under an allocation

agreement between parties at the same delivery point. Since there is little apparent consistency between these agreements it will be difficult to establish a consistent basis for trading at these points. This is discussed in more detail in section 18.2.

13.1. Impact of Market Characteristics - Bilateral Contracts

The form of the gas industry lends itself to bilateral contracting, which has the maximum flexibility and therefore the maximum ability to cope with variances in participants' existing arrangements, such as allocation agreements. The relatively small number of participants means that search costs are not likely to be prohibitive, but could be material for new entrants in the first instance. Alternatively, in the longer term parties should gain a better understanding of other participants' demand/supply positions. The concentrated market also means that the level of transparency and information flows that can be derived from bilateral contracts will be important considerations.

13.2. Impact of Market Characteristics - Pool Market

A pool market is possible under the current structure provided that it is limited by location. Pooling will only create efficiency (compared to bilateral arrangements) where several parties want to trade at the same time and at the same point. This is how competition and the lowest possible prices are achieved. The low number of participants means that a limited number of parties will want to trade in any given period and therefore they would need to trade at the same point to make pooling feasible.

The preceding comments apply to both a gross pool and a net pool. However, in the case of a gross pool, there is an additional consideration. Because both producers and users demand long-term contracts for a substantial portion of their gas, there is little benefit to be had from mandating a gross pool. A gross pool would require that all volumes were offered into the pool and that participants settle their contract positions ex post. There is no efficiency or competitive gain to be derived from such an arrangement and indeed it may be damaging to short-term contract prices and price signals:

- Arrangements already exist to operate the transmission system at the level of co-ordination required. It is likely that if a system operator were implemented through a gross pool mechanism it would seek to replicate the arrangements already in place.
- The volume of gas traded on long-term contracts will by far outweigh the volume traded on short-term contracts. This suggests that if all volumes were offered into the pool, the pool price could in effect be set by producers who had already sold the bulk of their gas under long-term contract. In the extreme, a large producer could set the price at a level that would be prohibitive to any short-term trading, thus controlling the market structure.

In addition, gross pools typically operate in markets with high levels of liquidity, supported by large competitive markets. These features effectively eliminate the majority of the risk

from significant price volatility/uncertainty and ensure that demand will always be met at 'reasonable' prices.[21]

For these reasons a gross pool is not considered as one of the three options for more detailed evaluation.

13.3. Impact of Market Characteristics - Clearing House

A clearing house requires a high level of liquidity to operate successfully. Section 6 explained that a clearing house sits on one side of the contract with each seller and buyer. This means that risk of default sits with the clearing house. This risk is only manageable where the clearing house is able to access sufficient quantities of gas to make up a default. It would be possible for the clearing house to do this under a similar arrangement to the current mismatch gas contracts or through liquidated damages on the defaulting party.

More crucially, liquidity is required so that the clearing house can make both sides of the trade. The clearing house does not have a use for gas and it would be costly if it regularly ended up with a surplus or deficit. Unlike some other clearing houses where the trade is financial or 'paper', gas is a time-limited commodity. Second, if the clearing house is to be able to buy gas as it is offered, it must be assured that there are sufficient parties wishing to purchase the gas at that price, so that it does not bear the cost of a spread between buy and sell prices.

The lack of short-term trading liquidity in the New Zealand market suggests that a prudent (and low cost) clearing house would only confirm a trade once it had the other side of the trade lined up. If this is the way that the clearing house operates then it is very similar to a platform bilateral market as it is essentially matching two parties' needs. Other forms of platform bilateral market could be achieved more cheaply than a clearing house. In other words a clearing house would not be efficient.

For these reasons a clearing house market is not considered as one of the three options for more detailed evaluation.

Q12: Do submitters agree with this outline of the key effects of the characteristics of the gas market on mechanisms for short-term trading? If not, what other factors should be considered and how do they affect the viability of the options?

Q13: Do submitters agree that both the clearing house and gross pool options are not likely to be practical mechanisms for short-term trading in the New Zealand wholesale gas market and should not be considered further? If not, please explain your reasoning.

[21] Under typical operating conditions i.e. with the exception of events such as *force majeure*.

14. Available Features and Contractual Terms

Section 12 addressed two of the fundamental aspects of the trading environment: would the mechanism be compulsory and would parties be able to identify the party with whom they had traded.

This section outlines some of the other features and contractual terms that are available for each of the mechanisms and their generic advantages and disadvantages.[22] Later sections describe the three specific options being considered and provide additional detail on the applicability and merits of each of these features and terms to that option.

Table 3 outlines the contractual terms and features that are, at least in theory, possible under each of the options outlined above. The table also considers whether there are any restrictions on the features available depending on the nature of the market mechanism as voluntary or compulsory, and on the ability for counterparties to be identified.[23]

Table 3 Contract types and contractual terms – matching possibilities

	Prudentials - financial	Prudentials - physical	Hub	All welded points	Dispute process	Revealing info to participants	Revealing info to non-participants	Standardised contracts
Direct bilateral	N	N	N	Y	Y	N	N	Y
Platform bilateral	Y	Y	Y	Y	Y	Y	Y	Y
Net pool	Y	Y	Y	Y	Y	Y (agg)	Y (agg)	Y
Gross pool	Y	Y	Y	Y	Y	Y (agg)	Y (agg)	Y
Clearing house	Y	Y	Y	Y	Y	Y (agg)	Y (agg)	Y
Anonymous	Y	Y	Y	Y	Y[1]	Y	Y	Y
Known counterparty	N	N	Y	Y	Y	Y (agg)	Y (agg)	Y
Compulsory	Y	Y	Y	Y	Y	Y	Y	Y
Voluntary	Y	Y	Y	Y	Y	Y	Y	Y

Note: 1 - If there is a market operator

Agg = only aggregated information would be available

Source: NZIER

22 For completeness the gross pool and clearing house mechanisms are included in this section although for reasons outlined in section 13 they are not developed for detailed evaluation.

23 It was also considered whether there are combinations of features in the table that could not co-exist. The only restrictions identified were where two features are opposites, for example trading at a hub and all welded/delivery points clearly cannot occur simultaneously. All other pairs of options are possible.

14.1.Prudential Requirements

If a party is unable to identify the counterparty to a contract before they agree to trade with them, then in order to manage their risk efficiently the parties must have access to information about the risk profile of the counterparty.

Full disclosure of a party's risk profile would be equivalent to identifying the party, particularly given the small number of potential participants in the New Zealand market. A preferable approach would therefore be to require parties to meet certain standards as a prerequisite to trading at various levels through the market mechanism. The standards would need to be low cost for the trading party to comply with and for the potential counterparty to comprehend.

One of the counter-arguments against anonymous trading is that for parties with a low risk profile, not being able to disclose that profile is value destroying (if others would be willing to pay a premium for the lower risk). A method for ensuring that parties with different risk profiles are able to be treated differently is to set trading limits that are party specific and depend on the financial profile of the party. The limits would reflect the participant's ability to purchase a compensating quantity of gas to rectify a default – so while they would effectively be a financial limit, they would relate to an underlying ability to purchase a volume of mismatch gas[24]. This would limit the total exposure of the market to default by a particular party, ensuring that the defaulting party would be able to fund the difference in price between the contracted gas, and mismatch gas.

The trading limits would relate to the net sell position of trades completed by a party within the trading mechanism. The reason for this is that if a party purchased a volume of gas on the market platform, then there is no reason to limit their ability to resell the same volume should it become profitable to do so – the risk attached to the re-sale is not related to that party. Clearly there is risk associated with buying 'resale' gas, but it relates to the ability of the original seller to deliver, not the reseller. The risk associated with buying resale gas is limited by the net sell trading limit of the original seller (not the reseller).

A party with a risky profile would have a relatively limited ability to trade (in terms of the net value of trades). Conversely, a low risk participant would have a relatively unrestricted net value which it could trade to. While the counter-party would not know the actual value of the trading limit of the participant with which it was trading, they would know that the system would not allow a participant to trade over their limit and they would understand the process for setting trading limits and the level of risk associated with this process. The potential counter-party would be assured that the ability of the party to meet the costs associated with default was accounted for in allocating that limit. Each participant's profile would need to be regularly updated (potentially by the platform operator) to ensure that the risks associated with parties were reflected in their trading limits.

Some gas industry participants have suggested that physical deliverability is the key issue facing those wishing to buy gas, not the financial ability of the seller as we refer to above.

[24] An estimate of the mismatch price (possibly based on historical maximums) would provide a unitary value to derive the underlying volume of mismatch gas that the participant could fund via its limit. This would be required as the value of the contract for the gas required from the defaulting party will exceed the value paid to the defaulter. The defaulting party therefore needs to be able to potentially purchase mismatch gas, and will be liable for the difference between the contract and mismatch prices.

However, it is not apparent that the risk of physical non-delivery will be changed by a mechanism for trading. In the event that a party did not supply a contractual obligation they would be in negative mismatch and the mismatch mechanism would close them out. The party who bought the gas via contract from the defaulter would receive mismatch gas and would pay the contract price to the defaulter. The defaulter would pay the mismatch price and suffer the difference between this price and the contract price.[25] If the market is illiquid, in other words no gas is available at the required time, then the defaulter should be required to pay liquidated damages, or if acceptable to the other party, deliver the gas on another day. This suggests that it is financial ability to meet liquidated damages that is a pre-requisite to participation, rather than physical position alone, although the financial limit will effectively be related to an ability to purchase an underlying quantity of mismatch gas.

The precise details of the standards that should be met are beyond the scope of this paper. However, we note that the Maui Pipeline Operating Code (MPOC) contains prudential requirements for shippers and welded parties, consideration should be given to mimicking these requirements.

Q14: Do submitters agree that a party-specific limit on the net trading position of participants is sufficient to manage the risk of default? If not, are there other risk management mechanisms that would allow anonymous trading?

Q15: Would submitters prefer a net sell position based on an ability to pay for an underlying quantity of mismatch gas or a pure volume measure? Please explain your preference.

14.2.Location

Given the small scale of the New Zealand gas industry and the likelihood that in many periods only relatively limited volumes will be traded, there is a need to consider whether the trading mechanism should be restricted by geographical location. Even in much more liquid markets (such as the US) trading occurs at so-called hubs. The key advantages of a hub are that:

- Transparency is increased since it is easier to comprehend a price and volume at a limited number of locations. As a demonstration of this, in the New Zealand electricity market, although prices are calculated for each of approximately 240 nodes on the transmission grid, it is most common to hear quoted prices at just two points (Benmore and Haywards). While not all contracts are priced at those nodes, participants are able to benchmark their contracts off these points.
- The more homogenous it is possible to make gas, the less information participants have to process when comparing options and deciding whether to trade, and the greater the liquidity in the market. Location is one facet of gas that can be homogenised.

The key disadvantages of trading at a hub are that anyone wishing to buy gas for use at another location will need to ensure that they can secure not only gas but the ability to

[25] Note the implication of this is that the mismatch price will place a ceiling on trading prices.

transmit that gas to the required location (similarly the seller would have to secure transmission to the location). Some parties may wish to trade outside of the mechanism if they see the cost of trading at a particular hub to be disadvantageous.

Some parties argue that the current structure of transmission pricing makes this difficult. However, the structure of transmission pricing actually reinforces the logic of a hub. For example, on the NGC pipeline it is necessary to reserve capacity in an annual block. If all gas is traded from a single point then it would be logical to reserve capacity from that point to the required delivery point on the NGC network; how the gas is purchased to fill that capacity (i.e. under long term contract or through the market mechanism) is a separate choice. Although this does not solve problems related to peaking transmission capacity, it is not necessary to do this to enable trading of gas.[26]

There are some parties who may not be able to trade in a market that requires trades to occur at a specific location, for example users who buy bundled gas and transmission from a wholesaler. However, it is not clear whether these users would be able to participate regardless of the location of the market, as the contractual terms from the wholesaler may not allow on-sale. This problem could reduce in the medium term if the trading mechanism allowed efficiency gains for major users, as they may seek to reduce the level of bundling in future contracts.

The choice of hub location is important since not all gas flows across a single point on the pipeline. If there are restrictions on parties' ability to nominate against the direction of flow or there are penalties in the form of additional transmission charges then there may be value associated with the choice of hub.

The most logical choices for a hub at this stage appear to be (in order of preference) Frankley Road and Rotowaro. The key considerations behind this are that:

- Under the Maui Pipeline Operating Code, Legacy Gas can only be traded at delivery points from the Maui Pipeline.
- Kapuni and Rotowaro represent existing natural trading points.
- Frankley Road is bi-directional whereas gas only flows north at Rotowaro.

While there is some (transmission) cost associated with routing gas to be traded through a hub, this is low relative to the overall gas price. By focussing trading (at least initially) on existing trading points, the additional costs should be minimised. Ensuring that the trading locations are compatible with the existing transmission framework and with the existing contracts for gas delivery maximises liquidity and eliminates costs that could be incurred relating to redesigning the system for scheduling the physical flow of gas, or to negotiating variations to contracts.

In the event of a hub model being considered appropriate, it would seem logical to commence trading at a single point (Frankley Road) and expand it to another point or points if demand warrants (this would become apparent if parties reported a lot of off-market transactions at another point). However, it would be more sensible to adopt two

[26] Note though that adopting a hub may also facilitate trading of transmission capacity since one of the points for the trade will be fixed. See section 18.3.

hubs if there is a substantial amount of gas flowing through Rotowaro that does not come past Frankley Road.

Other options have been suggested by market participants. Two of these are a notional trading point and a virtual hub. These are explained briefly below:

- A notional trading point would see trading occurring at all welded points but institute a process that allowed adjustment of prices at different welded points to the notional trading point. In effect, this could be thought of as a transparent reporting of prices adjusted for transport costs. The main advantages of this approach would be to allow parties to choose where to trade while still maintaining price transparency. The disadvantages are that it does not concentrate liquidity at a point, as trading remains distributed across welded points. Prices signals may not be clear to all participants if some parties are willing to pay a premium for bundled delivery (so the difference in prices cannot entirely be explained by the cost of transmission).
- A virtual hub is a point on the pipeline that is not a welded point. It would be chosen on a regular basis (perhaps quarterly) on the basis of minimising (total) transmission costs across shippers. Trading at a virtual hub on the Maui Pipeline could be accommodated by the Maui Pipeline Operating Code. The key disadvantage of this approach would be that it is not clear how this would mesh with existing contracts that require delivery to a specific point. For example, Maui Legacy Gas can only be delivered to a real, specific point and for this reason would be excluded from trading at a virtual hub. For this reason it is recommended that consideration of a virtual hub be postponed until Legacy Gas becomes less significant in terms of total gas volumes.

A final option that has been suggested is that a number of geographically close welded points be considered as a hub area. In some cases a small geographic area encompasses a number of important welded points where trading already occurs and some suggest that the transmission costs between the points are negligible. It is likely that a postage stamp-type system would need to be implemented whereby a number of points were covered by a single tariff, which would necessitate changes to the existing tariff structure. This approach could also raise consistency concerns around what are physical flows as opposed to traded volumes. These issues would require careful consideration and potentially some redesign of the transmission pricing framework which could be costly and time-consuming. It is not clear that there are substantial benefits from designating several welded points as a trading area. It is not recommended that this option is pursued.

Q16: Do submitters agree with the assessments of the relative advantages of trading at a hub and trading at all welded points outlined above? If not, what other factors should be considered, and how does your argument affect the conclusion?

Q17: Do submitters consider that the other options identified represent the range of potential solutions and that the assessment of them is accurate? If not, please elaborate.

Q18: Do submitters agree that Frankley Road and Rotowaro should be specified as hubs? If not, where do you consider a hub should be and why is it more advantageous than Frankley Road and Rotowaro?

14.3.Disputes Process

A successful trading mechanism has to have a suitable disputes process associated with it. One of the risks identified by gas industry participants is litigation, presumably associated with default on contract obligations. Standardising the disputes process will be expected to assist market participants in managing this risk.

If contracts are fully standardised (aside from delivery term and price) then a dispute process should be incorporated into the contract. This is likely to remove or reduce any asymmetry in the risk of litigation associated with different participants, particularly as a set of precedents are established over time on the precise meaning of standardised terms and conditions. Standardising contracts should also reduce the absolute risk of dispute as long as the terms are well understood. It will for example be important in a pool market to be clear about how ranking will occur if the physical market for some reason becomes illiquid.[27]

For non-standard contracts or direct bilaterals the type of disputes that could arise are more diverse, however a standard dispute process is still likely to be suitable.

All the options identified for short-term trading are amenable to some form of dispute resolution process.

14.4.Information Disclosure

One of the criteria relates to the availability of information. In a well-functioning market, information should be complete, available to all parties and provided in a way that can be comprehended by the parties. The ability of the mechanisms outlined to facilitate information disclosure vary, but all of them allow some level of information disclosure and a more restrictive condition may be the level of information that market participants are willing to allow to be made public.

At minimum, aggregate information on the total volume of trading for a particular period and some measure of price is required. Ideally, information about the level of line-pack, gate station data and other lower level details would provide participants with additional information to help inform their decisions to trade or not. In a pool market only the aggregates are available (i.e. total volume and the single clearing price). The options are more extensive in a bilateral market where maximum and minimum prices can be observed and a weighted average could be calculated. The limited number of participants in the market will mean that disclosing too much or too detailed information will allow other participants to identify their rivals' positions, information that could be used to commercial advantage.

[27] This issue should largely be covered by the Natural Gas Outage Contingency Plan (NGOCP).

14.5. Standardising Contracts

It is *possible* to standardise contracts in all of the trading mechanisms considered. It is *necessary* to standardise contracts in a pool market and if a clearing house is adopted. Where bilateral trading occurs, a spectrum of possibilities are available from individually negotiated contracts, through contracts with limited scope for negotiation, to fully standardised contracts where only price and term of delivery are distinctive.

Standardising contracts lowers negotiation costs and lowers the risk of dispute. From the perspective of maximising competitive outcomes for short term trading, they can also be a good option where one party has substantially more power in the negotiation; particularly if a neutral party can facilitate the drafting of the standard contract and/or the more powerful party is both a buyer and seller (meaning they have to bear both sides of the contract terms). The downside of standardising contracts is that being a form of averaging the fit to the specific circumstances and risks facing the parties is not as close as an individually negotiated contract.

Q19: Do submitters agree with the characterisation of disputes processes, information disclosure and contract standardisation outlined above? Are there any other factors that should be considered?

15. Direct Bilaterals

The majority of gas trading that occurs at present in the New Zealand gas market, whether short- or long-term, is via direct bilateral contracts. In simple terms, this involves a party seeking to buy gas contacting other participants to establish whether they have gas available at a price which would generate a trade. The two parties then negotiate terms and conditions, and a direct formal agreement to trade with each other. This form of direct commercial negotiation and agreement occurs for each trade with contracts being specific for that particular trade (although some larger participants have standing arrangements with regard to the terms of such agreements).

These contracts have been the main-stay of gas trading in New Zealand since widespread gas use was introduced, with a principal use being to help underwrite and ensure a level of fixed costs for both contracted parties. Users of gas require a stable supply of gas at prices which allow them to operate, and similarly the party providing the gas requires consistent levels of demand to cover the costs associated with bringing the gas to market.

The contracts represent routine commercial negotiation whereby as long as both parties accede the terms and conditions can be as flexible or restrictive as required. The contracts can vary considerably in terms of their complexity, however typically contracts set out the price paid for gas, maximum daily quantity (MDQ) for off-take and other conditions relating to the provision of, and access to gas.

Direct bilateral contracting occurs in most gas markets internationally, with the United States considered by many as the seminal example of a bilateral contracts model. There, the market is deep and in absolute magnitude is the largest in the world.

15.1. Contract Terms and Features for Direct Bilateral Trading

The discussion above focused on the basic workings of direct bilateral trading and how it operates at present in the New Zealand (for both long-term trading and existing short-term trading). The following information provides more detail on various factors inherent in this type of trading, and clarifies the features and contract terms that are proposed for direct bilateral trading of short-term gas contracts.

15.1.1. Anonymity vs. a Known Counterparty

Being a direct commercial negotiation between two parties, the counterparty to a direct bilateral contract is always known. Parties to a contract will typically seek information about the counterparty to aid in their negotiations, so knowledge about their financial and physical positions (in terms of gas holdings for example) could be particularly useful.

15.1.2. Compulsory vs. Voluntary

As direct bilateral contracts are simply negotiated agreements between two consenting parties their form is variable. If no other mechanism were available this would be the predominant method of trading. However, there would be no prohibition on other forms of trading.

15.1.3. Prudential Requirements – Physical and Financial

Prudential requirements are also dealt with as a matter of routine commercial negotiation. Both parties are likely to undertake due diligence to ensure that the counterparty is reasonably likely to be able to supply the gas being offered, or has the financial resources to be able to pay for the gas being sought. Given the relatively small number of participants in the market, firms are likely to possess some information about their counterparties' position, but default conditions are likely to be part of most contracts to mitigate risk of non-delivery or non-payment.

15.1.4. Trading at a Hub vs. Trading at all Welded Points

Trading via direct bilateral contracts could theoretically occur at any/all welded points/delivery points – again, a matter for commercial negotiation between the contracted parties.

In theory trading via a hub could also occur, but all parties would need to be willing to contract for supply to, and off-take from that point in each individual agreement. This occurs to some extent in the United States, where the hubs represent points on the transmission system where pipelines join and gas is able to be transferred from one system to another. These are essentially 'natural' trading points, and they are hubs for that reason. In New Zealand a similar situation currently exists were some locations (e.g. Rotowaro, Kapuni) dominate trades.

15.1.5. Revealing Information

As is the case for existing gas contracts in New Zealand, the information contained in a direct bilateral contract is typically confidential, and firms are usually hesitant to reveal the terms and conditions of contracts to other parties whether they are participants or non-participants. This can make it particularly difficult for potential new entrants to gain

information, and information is generally asymmetric in its availability. This will be discussed further in section 15.2.2.

In deep and complex direct bilateral markets such as the United States, the volume of trades means that a voluntary system of reporting trades is able to operate. Locational prices for the various hubs are made available on a daily basis, sometimes hourly. The large volumes of trading at each hub mean there would be no issues around identification of parties (and prices paid etc.) – this would not transfer well to the New Zealand context.

15.1.6. Standardisation of Contracts

As they are negotiated on a case-by-case basis between parties, there is a limited amount of standardisation across direct bilateral contracts; their scope could be quite varied. In markets where there was a high degree of competition in the supply of gas, users could potentially put pressure on suppliers to offer contracts which contained some standardisation.

Where parties have traded repeatedly on previous occasions there may be some standardisation of terms and conditions and some participants are likely to maintain consistency across their own contracts to reduce their contracting costs.

15.1.7. Dispute Process

The details of any process for settling disputes would be a matter for commercial negotiation.

> *Q20: Do submitters agree that the characterisation of the contract terms and features of direct bilateral trading outlined above is appropriate? If not, what additional, or different terms should be considered and why?*

15.2. Direct Bilateral Contract Evaluation

The following sections evaluate the direct bilateral contract mechanism against the criteria previously outlined. The evaluation will allow better identification of the overall suitability of the option to the New Zealand context.

15.2.1. Efficiency

Direct bilaterals do not score as highly as the other options on efficiency grounds. Given the lack of transparency about potential contracts on offer, gas supply may not go to its highest value use. In addition, given the resource intensive nature of the search process there is a limit on the contracting party's willingness to search exhaustively. These two factors mean that a buyer and seller may never become aware of one and other.

The number of new entrants may also be restricted because of a lack of experience with the mechanism, and they may be overlooked by other parties either because they are not aware of them, or because they have a relatively high (or unknown) risk profile. The lack of transparency around the price at which contracts are being confirmed will make it difficult for a potential entrant to judge the likely prices in the market prior to formally tendering for supply and hence assess the risk of their venture prior to making an investment decision.

Once entry does occur though, the limited size of the market should mean that participants are better informed about the cost of gas and hence the potential impact this may have (in conjunction with other factors) on investment. The direct nature of the contact between seller and buyer means that there is unlikely to be much scope for gaming in terms of sellers holding off from confirming deals to ensure buyers offer their highest price. A party seeking a direct bilateral negotiation should be able to seek alternative suppliers (although the market size may limit the choice available).

15.2.2. Information Availability

One of the key characteristics of a well-functioning market is the presence of complete, comprehensive, available information.

Direct bilateral contracts have a low level of transparency as they are generally confidential to the contracting parties. This limits the information available to participants and non-participants on the volumes available and actually traded, and prices.

Although voluntary reporting of information on bilateral contracts operates successfully in the United States, the limited size of the New Zealand market means this is unlikely to be successful (parties are likely to either not report, or mis-report). Given the size of the existing market, and the scope for growth it is still unlikely that the level of trading would be deep enough to allow useful price discovery. Moves towards increased levels of vertical integration (such as electricity generators investing in exploration) could mean that pricing becomes an internal cost for a firm, further reducing the level of information available.

15.2.3. Contract Availability and Competitive Effects

This key criterion focuses on assessing the ability of direct bilaterals to generate competitive outcomes, and the levels of contracts which are made available through this mechanism.

We noted earlier that the long-term contracts currently being offered tend to exhibit much stricter conditions in terms of off-take and that buyers have to purchase relatively flat profiles of gas which do not necessarily match their demand profiles. This means that short-term contract availability should increase relative to the current situation. This outcome is not however specific to this mechanism, rather it is a generic result of the limited availability of flexibility. The lack of significant depth in the supply of gas will limit some of this growth, as the ability of users to apply pressure to increase the level of contracts available is limited.

Relative to other more transparent mechanisms, the opportunities for competitive outcomes to be created are likely to be muted in a direct bilateral market, as parties can only observe a binary outcome (contracted, not contracted) – the reasons for the outcome are unlikely to be clear. This means that the learning from repeated experiences is not as high as it could be.

Risk management outcomes are likely to be sub-optimal relative to other potential trading mechanisms because identifying and agreeing to the appropriate contracts is resource intensive (high search and negotiation costs). The small number of participants in the market, and the repeated interactions that result will mitigate some of this impact though.

15.2.4. Regulatory Certainty

Given the low level of fit between this option and the other criteria, it is not likely to enhance regulatory certainty. On the other hand, given its similarity to the status quo, this option will not be as costly to implement as the other options. This means that future potential regulatory change would not entail as great a loss of value as a change might under other options.

15.2.5. Administrative and Other Compliance Costs

The costs associated with trading via direct bilateral contracts differ quite markedly from those associated with trading via a net pool or platform bilateral contracts. There are no administrative costs or set-up costs as such, and essentially there are few compliance costs since there are no trading rules. The key, material costs come with the negotiation of the contract itself. Participants will face search costs in identifying potential suppliers of gas (or buyers of gas for those wanting to sell gas) and also in terms of seeking information about the counterparty to the contract.

As we noted earlier, for a new entrant these costs could be material, depending on the parties involved, and the complexity of the agreement. The extent of the search costs involved with seeking information about other parties will to some extent be constrained by the size of the market and the limited number of players involved.

15.2.6. Practicality

Direct bilateral contracts are highly practical to implement, and have been operating in the New Zealand gas market for many years. They are also the primary form of contracting in many commodity/physical markets. Direct bilateral markets operate successfully in the United States and other major gas markets such as the UK.

15.2.7. Equity

For a trading mechanism to be considered equitable parties with the same amount of a relevant characteristic should be treated in an identical fashion and differences should be treated in a way that is proportional to that difference.

In terms of treatment of parties by size, a direct bilateral mechanism is potentially biased toward larger participants. Larger players are more likely to be approached for a potential trade. Larger parties may also have a stronger negotiating position.

This may also be the case in terms of the parties' position in the supply chain. For reasons of commercial confidentiality a picture of gas contracts against demand is not available. However, the balance of negotiating power lies with producers in long-term contracts under current market conditions. If this is also true in the short term (given a shortage of supply) then buyers are at a disadvantage.

It is worth noting that at certain times (of the day, week and year) buyers may be over-contracted, and therefore there may be a surplus of supply. Any party seeking gas in such a period would be in a relatively strong negotiating position. Significant changes to the gas supply situation (i.e. a significant domestic gas find) could also alter the relative negotiating positions of parties.

While the incorporation of some standardisation of contract terms and conditions could to some extent reduce this bias, it is not clear how an incentive could be created in the current supply situation to encourage the stronger party to adopt such a contract. There is likely to be a trade-off between gaining concessions on price, and on other contract terms and conditions.

15.2.8. Scalability

Overseas experience of direct bilateral markets confirms that this mechanism is scalable. Markets with a large number of participants, at a large number of trading points operate successfully and are able to adjust for changes to the size of the market. As each contract is negotiated separately, the terms and conditions can be as expansive or restrictive as the parties agree.

Q21: Do submitters agree with the assessment of the direct bilateral trading mechanism? If not please explain the nature of your argument and what it would mean for the relative score in Table 4.

16. Platform Bilaterals

The second option is a 'platform bilateral' mechanism. Fundamentally this is similar to a system of direct bilaterals; a contract would be agreed between two individual parties. The key distinction between the direct bilateral and the platform bilateral is that under the latter option an organised platform is provided that allows parties to easily and inexpensively signal the availability of a quantity of gas to sell (or their desire to buy) and the price at which they are willing to trade. The platform would allow participants to simply select a contract to which they wished to become the counter-party. Both parties would then be informed of their obligation and settlement would occur between the parties. Buying a large quantity of gas could necessitate entering a number of separate contracts.

16.1. Contract Terms and Features for a Platform Bilateral Mechanism

Section 14 considered in broad terms the types of contract terms and features that could be a function of a trading mechanism. This section sets out more detail on a proposed platform bilateral market.

16.1.1. Anonymity vs. a Known Counterparty

The counterparty will be revealed after the trade has been confirmed. The reason that the parties will not know prior to the trade is to eliminate any potential for discrimination between counterparties. This will maximise potential competition and liquidity in the market

Once the match between supplier and purchaser is made the counterparty will be revealed in order to allow the mechanics of the trade (including payment) to be completed. This will also allow a dispute process or redress in the case of default by either party.

The key disadvantage of anonymous trading (in isolation) is the lack of information about the counterparty's risk profile. Parties may be hesitant or unwilling to trade if they are unable to assess the risk associated with a trade. Imposing individual trading limits on

market participants will ensure that risk profiles are accounted for, see section 16.1.3 for details.

A secondary disadvantage is the risk that some participants may attempt to game the market by entering offers to buy or sell gas and then accepting the contract themselves. This could have the effect of inflating the price 'paid' and the apparent volume of trading. While it is not clear how likely this would be to occur in practice, mitigating its potential effect is relatively simple. Parties would be prevented by the rules set on the platform from entering a contract with themselves. In the event that they changed their mind about a particular offer the option to withdraw would be available provided no one had accepted the offer. To cover the risk of two parties arranging to buy and sell from each other to achieve this effect, the market would report net trades only.[28]

16.1.2. Compulsory vs. Voluntary

A platform bilateral market would be voluntary. It would be costly to police a compulsory mechanism of this kind since it is a net market. In addition, it is preferable to allow competition between trading platforms in order to ensure that the most efficient method of trading is adopted.

In the event that a bilateral platform market is identified as the best option and is implemented, parties may still on occasion choose to trade outside the market. Having a standardised market brings advantages in terms of lowering the costs of search and negotiation, but at the expense of less complete risk mitigation. Off-market transactions will occur when the parties' risk management needs do not match the contracts available through the market and can be better met in another way.

16.1.3. Prudential Requirements – Physical and Financial

Given that parties will be unable to identify the counterparty to a contract before they agree to trade with them, in order to manage their risk efficiently the parties must have access to information about the risk profile of the counterparty.

This would be achieved via a limit for individual participants related to their financial capabilities.[29] A limit would be placed on the net dollar value of trades completed by a participant, so the total exposure of the market to default by that party is limited. The dollar limit would represent the ability of a participant to purchase an underlying volume of mismatch gas, should they default and be required to purchase 'make-up' gas[30]. The defaulting party must be in a position to absorb the effect of the price difference between the contracted gas and mismatch gas. The limit would be on the net trade value so as not to limit a participant's ability to resell gas it has bought on the market should it become more profitable to resell than to use the gas itself.

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28 Suppose party x purchased 10 units from party y and party y purchased 10 units from party x at the same price. The market would report a net volume of trading of zero. Where the trades occurred at different prices it would be assumed that the trading was genuine (since a transfer of value would occur).

29 A party with a substantial volume of gas that had been confirmed would be able to register for a trading limit even in the event they were cash poor, as they would be able to use their future earnings from the gas as security.

30 An estimate of the mismatch price (possibly based on historical maximums) would provide a unitary value to derive the underlying volume of mismatch gas that the participant could fund via its limit. This would be required as the value of the contract for the gas required from the defaulting party will exceed the value paid to the defaulter.

The limits would need to be re-assessed relatively frequently to ensure that a party's risk profile was accurately reflected in their trading limit. See section 14.1 for more detail.

One key advantage of establishing trading limits for individual participants rather than setting a benchmark financial prudential requirement is that a new entrant is enabled to start relatively small and grow, rather than having to enter the market at a significant size. While they may still require long-term contracts, the ability to contract for short term volumes could help them better manage their portfolio initially.

As discussed in section 14.1**,** it is not clear that the risk of physical non-delivery will change with the implementation of a platform bilateral mechanism. For this reason it is considered sufficient to implement a net dollar limit (based on ability to purchase a volume of mismatch gas) on trading to cover the risk profile of the relevant party.

Other forms of risk were discussed in footnote 18, such as propensity to enter disputes and lack of market experience. The standardisation of contracts as discussed in 16.1.6 mitigates some of these risks by ensuring that key terms and conditions other than price and volume (such as the processes for dispute resolution) are equitable.

16.1.4. Trading at a Hub vs. Trading at all Welded Points

While trading at all welded points is possible, trading at a hub is likely to help at least focus existing liquidity and to establish a platform for increased trading. Section 14.2 outlined a number of advantages to hub trading, including the need to allow for Maui gas to be traded and the tendency for existing short-term trades to occur at potential hub points. The characteristics of Frankley Road tend to suggest it would be a preferred first hub, with the possibility of adding Rotowaro should demand warrant it.

16.1.5. Revealing Information

Two options for information disclosure are feasible under a platform bilateral option:

- Maximum trade price, minimum trade price and total (net) volume traded.
- Weighted average price and total (net) volume traded.

Prima facie the more useful of the two options to both existing players and new entrants is the weighted average price since this prevents a small trade at an outlying price from skewing the figure. For this reason it is suggested that this option is adopted.

With both the options outlined there is a risk that given the small number of participants in the market and likely small volumes of trading, parties will be able to identify the price paid for some portion of gas (particularly if they traded in that period).

If this was deemed a significant problem by market participants (the test is whether it would hinder the use of the platform), guidelines could be developed that suppress data in the event of particular circumstances. For example, Statistics New Zealand uses "the (n, k) rule". This means that if n or fewer enterprises make up k percent or more of a piece of data, then the data is suppressed. For the Business Activity statistics for example, n is 2 and k is 80. In other words, if 2 enterprises comprise 80% or more of a piece of business activity data, it is suppressed.

A second option would be to delay publication of the data for some period. Statistics New Zealand offers this option for trade statistics where parties request suppression and

an identification risk is confirmed. The delay ranges from 3 to 24 months. Delaying the release of data for a long period is not recommended as it would limit the usefulness of the market in the short term and it could restrict parties' willingness to participate as the results would not be clear.

16.1.6. Standardisation of Contracts

A platform bilateral mechanism would operate on the basis of a standard contract. This ensures that the product being sold is homogenous. The contract would specify technical terms relating to the gas as well as commercial terms related to disputes including penalties, the terms of payment and force majeure.

The duration of available trades would be daily from today and weekly from the next complete week. This would correspond with the nominations cycle. There is no apparent reason to restrict durations more tightly than this (since if the demand does not exist, trading will simply not occur).

Price would be as agreed between the parties for specific contracts on the platform. All trades would be recorded by the platform to assist in the event of a dispute.

16.1.7. Dispute Process

The standard dispute process in the event of default by either party would be specified in the contract. The details of this process are beyond the scope of this paper.

> *Q22: Do submitters agree that the characterisation of the contract terms and features of platform bilateral trading outlined above is appropriate? If not, what additional, or different terms should be considered and why?*

16.2. Platform Bilateral Evaluation

The following sections evaluate the platform bilateral mechanism against the criteria outlined in section 4.

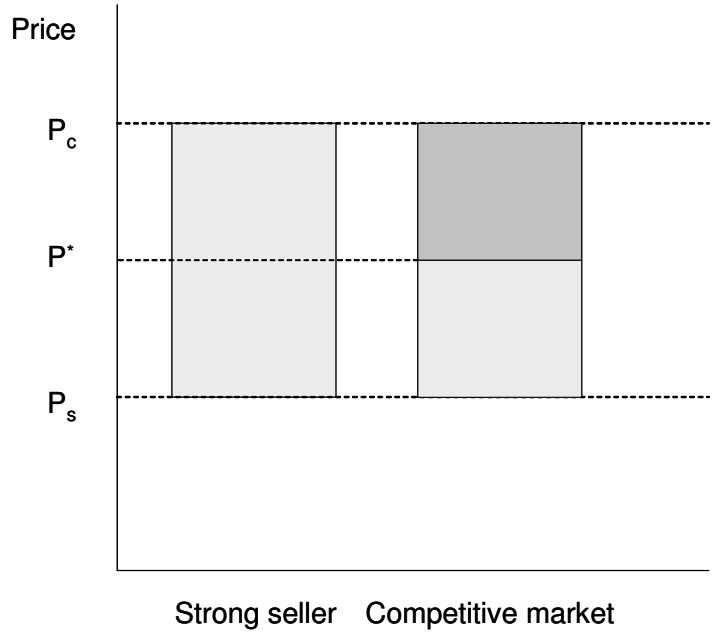
16.2.1. Efficiency

It is important that both the mechanism used to trade and the outcome of trading are efficient. In terms of the mechanism used the question is whether another method of trading is available that would achieve the same outcome at a lower cost (i.e. is the mechanism productively efficient). In terms of the outcome, while it is relevant to ask whether productive efficiency is achieved, it is more critical to consider whether resources (i.e. gas) are allocated to their most efficient use, and investment incentives are enhanced. The platform bilateral mechanism is a low cost mechanism that allows effective trading of a relatively homogenous product (i.e. gas traded on standard terms and conditions at a hub). However, there are conditions which could create opportunities for gaming by market participants that may result in resource waste i.e. productive inefficiencies, compared to the other mechanisms.

In particular, the party with more market power (probably sellers) may be able to hold out from confirming any deals until the last minute in order to ensure that the other parties (probably buyers) offer the highest possible price. In situations where there are a restricted number of sellers, this does not require the producer to in any way misuse its

position, rather it is in a position of strength simply because there is a shortage of supply. Although the *outcome* of such behaviour is not inefficient (as long as trades occur at a price equal or less than the buyer's willingness-to-pay and all trades for which the buyer's willingness-to-pay exceeds the marginal cost of supply actually occur) the *process* may be as parties expend resource trying to figure out the optimal time to trade. In contrast, in a very competitive market the trade would occur as soon as the price offered by the buyer was higher than the marginal cost (minimum price at which the seller was willing to sell). This suggests that the distribution of the surplus (the difference between the price at which the seller is willing to sell and the buyer's maximum willingness to pay) would alter.

Figure 2 Price under a platform bilateral trading mechanism



Source: NZIER

Figure 2 illustrates the issue. Suppose that the seller is willing to sell at price P_s, and the consumer is willing to pay up to P_c. In a competitive market the outcome is likely to be somewhere in the middle, say P^*.[31] The consumer receives a surplus or benefit of the difference between P_c and P^*, denoted by the dark grey box. The producer receives a surplus or benefit denoted by the lighter box, being the difference between P^* and P_s. Where there is a shortage of supply the supplier is able to gain the majority, if not all the consumer surplus and charge P_c.

From an economic perspective this does not alter efficiency. The Commerce Commission agrees, noting in its *Guidelines to the Analysis of Public Benefits and Detriments* that "distributional issues are subjective and … [our] approach is not to apply differential weights to benefits (or to costs) according to the extent or nature of the population

[31] It is not necessarily the case the P^* would be exactly in the middle as it is drawn here.

affected."[32] However it is possible that the government may place a higher value on consumers' surplus than producers' surplus.[33]

Note that while we have assumed in the discussion above that there is a supply shortage and producers hold a stronger position there may be times when the opposite occurs. In particular in times of very low demand, there may be a surplus of gas available that parties are obligated to buy under long-term contracts but for which they have no use. In such a case the reverse would occur – in other words, the consumer would be able to capture surplus of the party with the fixed commitment to sell – potentially a wholesaler rather than necessarily a producer.

Importantly from the perspective of achieving dynamic efficiency, a participant would be able to re-sell gas to another participant in the event that the buyer placed a higher value on the gas. This would occur very simply as the potential seller would observe the offer price on the platform and choose whether selling or using the gas would yield a higher profit.

Compared to other mechanisms, platform bilaterals score poorly on productive efficiency, but relatively well on dynamic efficiency since there is a relatively low risk that a trade that a trade will not occur where the buyer values the gas more highly than the seller.

16.2.2. Information Availability

By its nature a platform bilateral market would allow all market participants to view all bids and offers (price and volume) submitted. Given the likelihood that the level of trading in the market will be low, particularly initially, it may be possible for a participant to track volumes that are bought and sold.

While some concern has been expressed that allowing participants this level of information would be equivalent to revealing commercial information, there are a number of mitigating factors:

- Non-trading parties will never discover the identity of the trading parties.
- Only one half of the transaction is visible (either the buyer's price or the seller's price).
- Traders could split their quantities into tranches, which would make the total quantity on offer by one party less apparent. This would be particularly true as liquidity increases.

From the perspective of non-participants, as well as those participants who do not wish to spend the resource tracking individual trades, a summary indicator is required. As outlined above, a weighted average price and the total volume traded is recommended as the most useful indicators from an information perspective. If it would increase participation in the market, a confidentiality rule could be developed along the lines of Statistics New Zealand's (n, k) rule.

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32 Commerce Commission, *Guide to the Analysis of Public Benefits and Detriments,* revised version December 1997.

33 This outcome is not unique to the platform bilateral, it is likely that where the seller has a relatively stronger negotiating position they will be able to capture a portion of the consumer surplus in any bilateral contract.

16.2.3. Contract Availability and Competitive Effects

The key characteristics of a platform bilateral market would be positive for contract availability and should be positive for realising competitive outcomes. The consistency with which the trades are undertaken, the use of trading limits as a risk management and default assurance mechanism, and the underlying standard contracts should create conditions for at least concentrating existing trades and probably increasing the level of trading. The transparent nature of the platform in terms of the volumes and prices at which people are willing to trade should help promote competitive pressures.

The main caveats around contract availability relate to the choice of physical location for trading and bundle size. If an inappropriate physical location is chosen for the hub, then parties will continue to contract off-market at a location that is more convenient to both parties. If the bundle size is set incorrectly (for example if the platform forces participants to offer small bundles and it is difficult to aggregate a larger quantity) then again, participants will continue to trade off-market.

For this reason, it is recommended that key existing trading points are chosen as hubs for the platform (Frankley Road and Rotowaro), and bundle size is as flexible as possible allowing participants to enter a total volume offered and a minimum bundle. Equally the platform should accept start and finish dates rather than requiring participants to check multiple contracts. These details of how the platform operates should be confirmed through a pilot process.

The level of participation should increase as search and negotiation costs will be lower than under a direct bilateral model. Competition between existing participants could also be expected to be higher than under a direct bilateral model since the process of agreeing to trade will be more transparent and easier to participate in.

Credit risk issues are addressed through the setting of individual trading limits.

16.2.4. Regulatory Certainty

The GPS requires the development of:

- Protocols and standards on trading (including quality, balancing and reconciliation).
- A secondary market for the trading of excess and shortfall quantities of gas.

The implementation of a platform bilateral mechanism would meet these requirements. In terms of regulatory certainty, by its nature it is hard to know what will motivate future regulatory change. Probably the key regulatory risk with the platform model is that the government may prefer that consumers capture more of the available surplus than they are able to under this approach. As described earlier, this is not an economic problem as long as trading still occurs, but it could be a concern to a government with strong preferences about the distribution of welfare. The government is unlikely to be able to influence the distribution of the surplus within the context of this mechanism, except by price controls. The other option would clearly be to review the choice of trading mechanism.

16.2.5. Administrative and Other Compliance Costs

The key costs associated with this mechanism will be the set-up costs for the platform itself. Because the platform will most likely be operated electronically it will be important to robustly check that the issues outlined above are all addressed. Prior to commencement of the market, a standard contract will need to be agreed and rules put in place around individual parties' credit limits. Any restrictions relating to self-trading and netting off-setting trades will need to be implemented. Systems will need to be set up to ensure that prices are reported in line with agreed rules. Participants will need to receive an appropriate level of training in order to operate in the market.

Although there are many details to resolve prior to a platform bilateral market beginning to operate, the cost of doing this and the set-up costs for implementing the platform are likely to be low relative to some other mechanisms (such as a pool). The reason for this is that technology is available both within New Zealand and overseas to operate systems such as this, and the cost of modification and implementing the desired rules should be relatively low (compared to the cost of implementing and modifying the net pool). It is strongly recommended that an existing, proven technology is adopted rather than developing a new system in order to ensure establishment costs are minimised.

Ongoing administration and compliance costs are low. From individual participants' perspective, it is likely that the only ongoing compliance costs will relate to regularly updating their profile (for the purpose of trading limits). The platform itself will obviously need to be maintained and have appropriate IT facilities. These should be able to be contracted to an organisation (anywhere in the world) that performs similar functions already.

16.2.6. Practicality

A platform bilateral model scores well on a practicality measure. As a relatively incremental change from the existing system of direct bilaterals, there are no identified hooks in terms of implementation. Similar platforms are currently used overseas, indicating a high level of post-implementation practicality. For example, in the UK EnMO runs on-the-day commodity market trading on a very similar basis to that outlined here. The US hub trading model is not platform based, but does suggest that bilateral trading at a point is successful even for much larger markets.

16.2.7. Equity

The process of setting individual credit limits based on a participant's specific risk profile means that this option scores highly in terms of equity. When trading occurs, parties can be confident about the level of risk they are taking on. A specific participant's ability to expose the market to risk is constrained, and the potential consequences of default are clearly identified. The limits will ensure that the potential cost of default can be met. This means that the contracts offered on the market are equal and no further discrimination should be possible (or desired).

Trading limits also allow small parties to participate in the market in proportion to their riskiness without being discriminated against by other parties. This will enable start-up to occur more easily than at present.

16.2.8. Scalability

The use of a platform bilateral market in the UK for on-the-day trading and the more extensive use of bilateral contracting at hubs in the US indicate that there are no issues with the market expanding organically. There could be a problem however if a single large field is discovered, or LNG is imported. The reason for this is that it could exacerbate the issue around the distribution of surplus between producer and consumer. If the field were sufficiently flexible, the market could become redundant if the producer offered very flexible contracts, alternatively the producer could have sufficient size to set the price (depending on their size relative to the rest of the market). However, it is not apparent that any of the market mechanisms evaluated can remove a problem created by market share.

Q23: Do submitters agree with the assessment of the platform bilateral trading mechanism? If not please explain the nature of your argument and what it would mean for the relative score in Table 4.

17. A Net Pool Mechanism

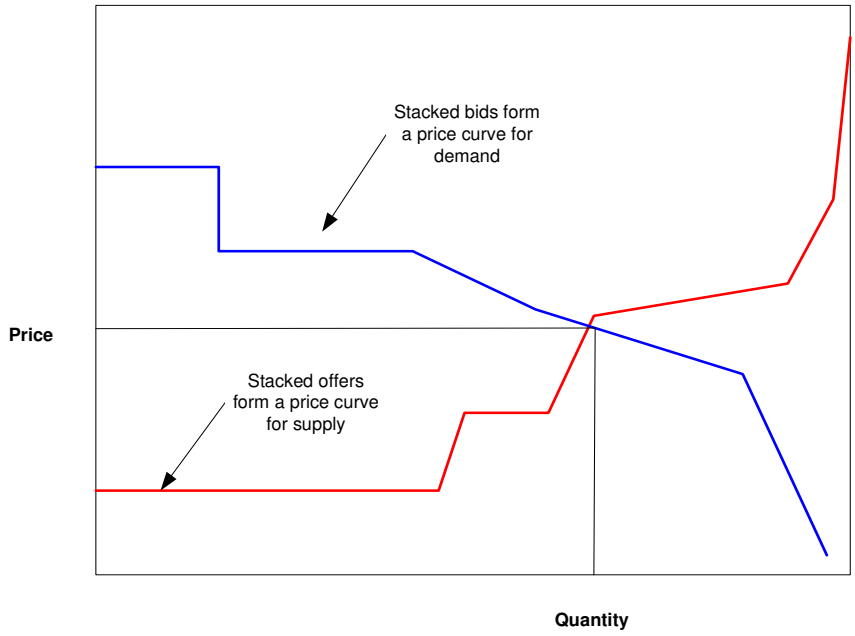
In simple terms, a net pool mechanism in the wholesale gas market would look to balance supply and demand for gas through the matching of competitive marginal bids and offers.

Those with surplus gas to sell offer it, at a price they nominate, to the pool. These parcels of gas are then 'stacked' by the pool in order of price to form a supply curve. At the same time, those with a shortfall of gas submit a bid to the pool for a specified quantity and price. These are stacked in descending order of price to form a demand curve.

Matching the supply curve and the demand curve determines the clearing price and volume. All successful parties receive (or pay) this market clearing price. Effectively, all offers receive the marginal price of the last unit of gas supply which meets total demand. For all the participants who offer into the pool (other than the offer at the margin[34]) the price they receive will exceed their offer price. For those who bid into the pool (apart from the bid at the margin[35]) the price they pay will be lower than their bid price.

[34] For this offer, the clearing price will equal their offer price.
[35] For this bid, the clearing price will equal their bid price.

Figure 3 Determining price through a pool model



Source: NZIER

The determination of price in this manner means that the price at which total demand is cleared is only known *ex-post* i.e. those who offer in gas will not know they price they receive until the market has been cleared. This method of deriving a spot or clearing price is similar to that used in the electricity market in New Zealand. The difference between the electricity market and the gas market would be that while the electricity market is cleared in real time, trading on the gas market would be completed ahead of delivery. In other words, participants would know the price and quantity they had purchased before the gas was required and delivered. This is necessary to avoid costs associated with consuming more gas than is nominated for a given period.

This mechanism could be operated by either an independent market operator, or potentially through an electronic, technology-based channel.

Further details of a net pool mechanism in a New Zealand context are examined below, in terms of the key contract features and terms that it is proposed would accompany such a market design.

17.1.Contract Terms and Features for a Net Pool Mechanism

17.1.1.Anonymity vs. a Known Counterparty

The net pool model involves bids and offers being supplied to a third party (or through an IT channel) who provides the service of clearing demand from the stacked supply of gas. As total supply and total demand are being aggregated, there is no direct counterparty as such. The bidder does not contract with a specific counterparty for supply. The gas offered in is being pooled to meet demand, rather than a single offer being matched to an equal and opposite demand as in a direct bilateral contract. As such, a pool mechanism will

always be anonymous in that a supplier of gas will not know whose demand they are satisfying.

17.1.2. Compulsory vs. Voluntary

It is theoretically possible for a net pool mechanism to be either compulsory or voluntary in nature. The practicalities of 'policing' a compulsory system however, would be prohibitive.

With a net pool only being concerned with gas not traded via direct bilateral contracts, it would be difficult to ensure that all short-term trades were conducted via the pool. It would effectively require a central register of all the long-term contracts and checking that actual flows matched contracted positions net of pool trades. Maintaining and updating such a register, and monitoring the gas flows would be impractical and prohibitively costly given the level of short-term trading which is expected to occur relative to the size of the total gas market.

17.1.3. Prudential Requirements – Physical and Financial

Given that a net pool mechanism will be anonymous, a system of prudential requirements will be necessary to ensure that participants face known risk of default.

As for a platform bilateral market, prudential requirements would take the form of a net trading limit on individual participants that was a function of their risk profile. This would limit the total exposure of the market to individual participants, while still ensuring that the defaulting party was liable (and able) to pay the entire cost associated with default. This would mean that the participant would be subject to a financial limit, which reflected their ability to purchase mismatch gas to rectify a default. They would need to be able to incur the difference in purchase price between the contracted gas and the mismatch gas price.

While it should be ensured that the burden falls on the party proving their ability to pay, it should not be so onerous as to discourage them from bidding. Confidentiality of such a measure would not be an issue, given that the only party who would see the measure would be the party operating the pool.

17.1.4. Trading at a Hub vs. Trading at all Welded Points

In theory, trading via a net pool mechanism could occur at a hub (or hubs) or at all welded points. As with the compulsory vs. voluntary consideration however, the suitability of trading at a hub is likely to differ from the suitability of welded point trading, for the New Zealand context.

For the reasons outlined in detail in section 14.2, trading would occur at a hub. Initially trading would only be available at Frankley Road. If demand warranted it this could later be extended to Rotowaro. Participants would be able to obtain transmission capacity away from the hub prior to trading and use this to return gas traded at the hub to their point of demand.

Hub trading occurs for the pool in the United Kingdom, with the hub point being a notional balancing point (NBP), not a physical point on the transmission network.

17.1.5. Revealing Information

Given that a net pool is anonymous, limited information is ‘naturally’ available to either participants or non-participants. In the electricity market the offer stack is released with a

delay. Given the low level of liquidity expected in the short-term gas market, participants are unlikely to agree to this information being released (or use a mechanism that releases it) without a substantial delay. This would reduce the usefulness of such information.

However, the nature of a pool in producing a clearing price means timely information could still be provided. Participants should be less concerned about the release of the market clearing price, and the total volume of gas traded to participants and non-participants alike. This would be analogous to some of the summary information disclosed by the NZX, in terms of the market price index, and the volumes traded during the day. It is unlikely particularly as volumes traded increase that parties could be identified from this aggregate information. The transparency of the clearing price and the volumes would be particularly valuable for non-participants providing a measure of the volatility and depth of trading in the market which is not available under the existing arrangements.

In the event that market participants limit their participation in the market because of confidentiality concerns, there is the option of developing a rule, similar to Statistics New Zealand's (n, k) rule as discussed in section 14.4. The trade-off that is implicitly being made by reducing transparency is a slower development of market liquidity (because it is not clear how the market is 'working'). In the worst case scenario liquidity may fail to develop in an opaque market.

The Victorian market operator VENCorp operates market information bill-boards providing quite a lot of detail for participants, but also provides aggregate information via a web-site for non-participants.

17.1.6. Standardisation of Contracts

By its nature a pool requires standard contracts. Participants enter a contract with the pool operator via the market rules, agreeing terms and conditions including force majeure clauses, default processes etc. Gas that is traded through the pool is backed by these conditions.

17.1.7. Dispute Process

A dispute process would be standardised in the pool contract or rules agreed by participants. The details of the process are outside the scope of this report.

> *Q24: Do submitters agree that the characterisation of the contract terms and features of net pool trading outlined above is appropriate? If not, what additional, or different terms should be considered and why?*

17.2. Net Pool Evaluation

The following sections evaluate the net pool mechanism against the criteria in section 4.

17.2.1. Efficiency

A net pool market mechanism scores relatively highly in terms of efficiency since it allocates resources to their most valuable use when the market clears. The key caveat to this is that it relies on participants entering their true willingness-to-pay and the true marginal cost of sale. This is more likely to occur the higher the market liquidity. This is where the practicality of a net pool mechanism, given the characteristics of the New

Zealand market, is called into question. In section 15.2.1, we discussed the gaming that parties in a stronger negotiating position could undertake in a bilateral trade. For a pool the incentive to try to capture the consumer surplus remains, but the method is slightly different. Because traders have to enter the volume and price they are offering (or bidding) to a timetable, they have no ability to hold-out to test whether the counterparty will increase its offer. Rather, they will attempt to estimate the willingness of the counterparty to pay and may inflate their sale price to (or near to) this level. This may bring some productive inefficiency depending on the level of resource expended on this task. Importantly though it could bring allocative inefficiency if the seller overestimates the buyer's willingness to pay. In this case a trade may not occur (because the offered sale price is too high) despite the fact that the seller actually places a lower value on the gas than the potential buyer. This would restrict sales to below the competitive level and result in so-called 'deadweight' loss. The scale of this problem is dependent on the depth of trading that is likely to occur, and is therefore limited by the potential size of the market.

The other important measure of efficiency for consideration is dynamic efficiency. This considers whether a net pool creates the right incentives for investment and innovation over time. These incentives are likely to be focused around the clearing price, the terms of contracts and the timing of market clearance. In general, the more limited the terms available (i.e. the period over which gas is contracted) and the less frequently that clearing occurs the less dynamically efficient the market. The more often participants are able to re-bid and offer the more easily resources are redistributed. This does not imply that the market needs to be continuously cleared.[36] Changes in the most valuable use of gas occur slowly across time as technology and other factors such as economic growth evolve, and unanticipated changes do not occur frequently – or change substantially once they do occur.[37] This means that the term and timing of clearing should be carefully chosen (see section 17.2.3). As liquidity increases more options may be available.

17.2.2. Information Availability

It was noted above that it is likely that information on trades in a pool would be limited to aggregate information about the final clearing price, and the total volume traded. The information is likely to be comprehensive in that it summarises the total trading that occurred, but it is somewhat deficient in that for prices it provides no indication of the spread across the distribution of trades.

The aggregate information will have different values depending on the position of the party. Currently, little information is available about prices for those outside the market. For these parties, aggregate information would be particularly useful providing them with an indicator of the volumes being traded, the level of the clearing price and how these are changing over time.

The aggregate information should be available soon after the market is cleared, and would be easily and cheaply disseminated.

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[36] This would be akin to a clearing house model.

[37] Clearly the most valuable use of gas changes at different times of the day and year, for example as electricity demand peaks. The key point is that these changes are relatively predictable and therefore do not necessitate continuous clearing of the market. Likewise, unanticipated changes such as unplanned outages do not occur sufficiently frequently to necessitate continuous clearing.

17.2.3. Contract Availability and Competitive Effects

This key criterion focuses on assessing the ability of a net pool to generate greater levels of competition amongst existing participants, and whether the level of market participation is likely to be increased through the introduction of a net pool.

There are some concerns around the absolute level of trading that would occur, and how this would impact on the effectiveness of a pool model. While pool models operate in both the United Kingdom and Victoria, both systems exist in dense network structures and are accompanied by multiple sources of supply (e.g. four sources of supply in Victoria). The absolute size of both these markets also permits levels of competition which are unlikely to be comparable with the New Zealand context. Unless the long-term bilateral market structure of the New Zealand industry changes, a net pool is never going to be large in relation to the total market, but the expected levels of trading (both in terms of number of trades and volumes being traded), and depth of participants could restrict the applicability of a net pool. The size of the New Zealand economy will ultimately restrict the level of liquidity.

For some potential participants the cost of operating through a pool may be too high to bear given limited resources available to manage their exposure to gas prices.

The duration of trading terms need to be sufficiently flexible to accommodate trading for balancing purposes (i.e. very short term) as well as allowing trades where plant outages may result in some participants having gas in excess of their requirements. On the other hand, the number of contract durations should be limited to ensure that sufficient bids and offers are entered to enable competition (which is the basis for the pool being able to operate, see section 13.2). Intra-day and day ahead terms are clearly possible, but other terms would have to be chosen carefully to cover the majority of trading requirements. For example, a contract for a month cleared two weeks before the start of the month could be considered as an option. Factors such as the normal length of demand or supply aberrations and the extent of foreknowledge are clearly important in determining whether this is appropriate. If the terms were inappropriate, a significant amount of off-market trading would continue to occur.

The level of competition will also depend in part on whether the point of trading is a hub or at all welded points. Trading via all welded points is likely to reduce average liquidity by spreading trading over a number of points. While the total level of trading may not change, the level of competition and availability of bids and offers at each welded point may decline.

Other factors supporting a pool model would assist in increasing the level of competition. Under a pool model prudential requirements (both financial and physical) would be incorporated that would effectively place trading limits on different participants. This would aid competition by making known the risk of default and increasing confidence in the ability of the market to deliver gas to the resource where it is most highly valued. The transaction costs associated with each trade would also be lower in a pool relative to direct bilaterals. This may increase participation once a party has opted in.

Although these factors would help to maximise potential levels of competition and contract availability, there is doubt over the wider applicability of a net pool model to a market

which will ultimately be bounded by the size of the economy, and the relatively small number of participants operating within it.

17.2.4. Regulatory Certainty

The net pool model is the most rule-based of the three options and as such it presents a higher risk of incomplete implementation, or later changes to rules. It probably also faces a higher risk that it will be deemed to have failed (most likely based on unrealistic expectations of the level of participation and competition, and the consequent price impact) and hence faces a higher risk of future regulatory intervention.

17.2.5. Administrative and Other Compliance Costs

Establishing a net pool would be the most costly of the three options presented in terms of set-up cost due to the need to agree detailed rules and the ongoing costs associated with clearing, invoicing, settlement etc. The pool may require an independent operator, although some of its roles could be automated. These set-up costs are likely to exceed those identified for the other mechanisms previously discussed.

The cost for participants is likely to be largely front-loaded, for example participating in the drafting and agreeing to the contract or rule structure, disclosing information for their risk profile and trading limits and learning how to trade on the platform. The last of these is likely to be particularly high relative to the other options, although some economies of scope may be available if a similar model to the electricity market can be adopted. Ongoing costs will be more limited, relating to updating profile details and offering/bidding and monitoring.

17.2.6. Practicality

In practical terms, New Zealand has experience of pool trading in energy. Net pool models operate successfully in other jurisdictions – the United States and Victoria, Australia are regularly cited examples.

In practical terms, it would require a longer establishment period than the other options, with the requirement of an independent operator and a formal process to be established for submitting bids and offers, as well as participant training and piloting.

17.2.7. Equity

For a trading mechanism to be considered equitable parties with the same amount of a relevant characteristic should be treated in an identical fashion and differences should be treated in a way that is proportional to that difference.

In terms of treatment of parties by size, a net pool mechanism should reduce inequities through the incorporation of the features previously discussed. Anonymity will ensure that a smaller (or larger) party could not be discriminated against, and prudential requirements would ensure that other parties would not have to face increased risk from default.

Standard contract terms and conditions would also assist in reducing any inequities by removing any element of asymmetry that may exist through more traditional methods of contracting. The provision of aggregate price and volume information would also help ensure any asymmetries are reduced compared to direct bilaterals.

These factors would also ensure that no party was treated differently because of their particular use for the gas.

17.2.8. Scalability

It is important that the mechanism considered most appropriate is able to cope with changes to the size of the market – both in terms of the number of trades and the number of participants. The net pool mechanism is well suited to growth, with increased volumes and numbers of participants adding depth to trading. Additional bids and offers would add to the competitiveness of the pool, and would result in more representative and stable market clearing prices.

While we noted that trading via a single hub would ensure that liquidity was focussed, the addition of other hubs, or trading via all welded points would still be feasible under a pool model. This would also be the case if additional sources of supply were introduced. Indeed this is a key feature of the pool markets operating in the United Kingdom and Victoria.

It is not evident that there are barriers to expansion of the pool model should it become more complex or increase in absolute size.

Q25: Do submitters agree with the assessment of the net pool trading mechanism? If not please explain the nature of your argument and what it would mean for the relative score in Table 4.

18. Other Issues to Consider

18.1. Industry Arrangement versus Regulation

If any type of organised mechanism is selected as the preferred option (i.e. platform bilaterals or a net pool) then there are two options for implementation. The first is that the industry reaches agreement about the details of how the arrangement would work and implements the mechanism. The second option would be to have the mechanism enshrined in regulation. There are advantages and disadvantages to each approach.

Although most industries are naturally averse to regulation because of the loss of control over the details of the arrangements and restrictions that are imposed on their conduct, there may be some advantages. In particular, s.27 of the Commerce Act prohibits arrangements or understandings that may substantially lessen competition. Any industry-determined trading mechanism would require Commerce Commission authorisation. This would be granted if the Commerce Commission considered that the public benefit from the arrangement outweighed the detriment from any lessening of competition.

The industry is best placed to understand what would work, and therefore make the best decisions about appropriate rules. On the other hand, it can be difficult to agree on the rules and on how to change them. Regulation forces compromise – albeit not necessarily perfectly.

This issue requires further analysis including consideration of the likelihood of the Commerce Commission granting an authorisation.

Q26: Do submitters wish agree that both these options require further consideration? If not, why not?

18.2. Gas Transfer Code and Gas Allocation

In the process of compiling the options for the wholesale gas market a number of other issues have come to light. One of these relates to the way allocation is made when gas is transferred between parties. Although the details of existing gas allocation agreements have not been examined, there appear to be some concerns relating to the backward implications of some agreements. In particular, agreements at some transfer points are dependent upon transfers at other points. On the face of it this could raise inefficiencies where parties cannot be sure of their volumes because they are dependent on the actions of another party at another point. Final reconciliation may not occur until months after the day in question.

This does not appear to create any issues for the establishment of a short-term trading hub on the Maui Pipeline because the issues appear to centre on the NGC pipeline. On the Maui Pipeline nominations are confirmed by 6pm on the day prior to transmission. This means that trading of known overs and unders can occur based on these nominations. The allocation arrangements on the NGC pipeline may however cause problems if there was any interest in extending the market mechanism to other locations.

Q27: Do submitters agree that issues with gas allocation can be resolved separately from the establishment of a trading mechanism? If not, why not?

18.3. Transmission Capacity Availability

Two transmission issues that have come to light in the context of the wholesale market warrant further investigation.

- NGC requires that a shipper wishing to trade at an interconnection point on its pipeline ensures that the party with which it trades has a Transmission Service Agreement with NGC.
- The availability of short-term transmission capacity on the NGC system is limited as transmission capacity has to be contracted in annual blocks.

The effect of requiring all trades at interconnection points to occur between parties that have NGC TSAs is to effectively require all parties who may wish to trade to reach agreement with NGC. This could clearly restrict the number of participants in the short-term trading environment.

A lack of short-term transmission capacity may restrict parties' ability to buy short-term gas contracts since they may not be able to ship it to the relevant location.

Both of these clearly affect the level of trading that may occur in the market, and therefore it should be considered whether options are available to alleviate the issues. For example, a default TSA contract may be useful if parties wish to trade but do not intend to use the NGC system. This should contain a clause indicating who receives title to the gas in the event that it enters the NGC system.

Another potential mechanism for alleviating this issue would be to adopt a virtual hub on the Maui Pipeline. This would be consistent with the Maui Pipeline Operating Code, and would mean that trading could occur at a point away from the NGC network, removing the need for all traders to hold an NGC TSA. However, for the reasons outlined in section 14.2 it is recommended that this option not be adopted until Maui Legacy Gas diminishes in significance in terms of the volume of gas flow.

The second issue requires a more innovative solution, ideally to create an incentive for NGC to offer short-term contracts or interruptible capacity as occurs in overseas markets. The adoption of a hub or hubs may help to reduce this problem since parties will know where trading is going to occur they can book annual capacity from the hub to their delivery point. Alternatively there may be an opportunity for a party (either existing or new) to secure annual capacity and then sell it in short-term blocks to gas users as they require it. This would only work from a hub to a common delivery point (i.e. there would have to be several parties sharing a delivery point). It would also be more likely to be profitable if the parties sharing the delivery point had different demand profiles (otherwise the party with the annual capacity contract would have periods where they were unable to sell the capacity).

Although these issues affect the level of trading, they are not considered deal breakers as they both currently exist and trading occurs regardless. While for some the transmission regime may not be ideal, the potential costs associated with altering these regimes would have to be carefully considered. In particular, the level of trading possible under the mechanisms discussed here will be no less than it currently is even if no change is made to the existing regimes.

Q28: Do submitters agree that these issues should be considered further but need not delay the development of the wholesale market? If not, what factors have not been considered that lead you to this conclusion?

18.4. Gas Industry Co Levy

A relatively minor issue has been raised in the context of discussions with participants. The definition of producers in the Gas Industry Co levy requires reviewing in the light of wholesale trading arrangements to ensure that it is a simple method of recovering the desired costs and there is no double counting of 'production'.

19. Summary and Recommendation

The sections above evaluated each of the three mechanisms being considered against a number of criteria. Table 4 provides a summary indicator of the relative strengths and weaknesses of each option against these criteria.

The first column in the table identifies an assessment of the **absolute** importance of that particular criterion in terms of achieving workable and efficient arrangements for trading of gas – the key objective of the overall programme for wholesale market design. The criteria are ranked from high (H) to low (L) in terms of their importance in reaching this goal.

The three adjacent columns look at the **relative** ranking of each of the mechanisms against each of the criteria, with a ranking of 1 showing the highest relative score in terms of that criterion and conversely a 3 being the lowest.

As we might expect, given the objective of achieving workable and efficient trading arrangements, the efficiency and practicality (analogous to workable) criteria rate 'high' in terms of their importance.

The two criteria ranked low are regulatory certainty and scalability. These rankings take into account the longer-term nature of their potential impact on the suitability of the mechanism for the New Zealand wholesale market.

Table 4 Absolute evaluation importance and relative evaluation of short-term options

Criteria	Absolute importance*	Direct bilateral	Platform bilateral	Net pool
Efficiency	H	3	1=	1=
Information availability	M	3	1	2
Contract availability/competitive effects	M	3	1	2
Regulatory certainty	L	3	1	2
Practicality	H	1	2	3
Equity	M	3	1=	1=
Scalability	L	3	1=	1=
Administrative costs	M	1	2	3
Compliance costs	M	1	2	3
Transaction costs	M	3	1=	1=
Default/dispute costs	M	3	1=	1=

Note: * Absolute importance in terms of achieving workable and efficient arrangements for trading gas
Absolute rankings are high (H), medium (M) and low (L).
Relative rankings are from 1 to 3, where 1 is preferred.

Source: NZIER

The direct bilateral mechanism ranks highly in relative terms for the practicality criterion as its simple underpinnings mean that it can be introduced easily and quickly (indeed it is essentially the status quo or 'do nothing' option). Its associated administrative costs and compliance costs are not material. It ranks poorly in relative terms for the majority of the other criteria, with the rankings for efficiency and competitive effects being of concern. Direct bilateral trading is relatively costless to administer (this excludes transaction costs) and is easy to implement, but is potentially prone to producing inefficient outcomes and does not provide clear signals to the market. With respect to the scalability criteria, it has received a low ranking principally because search costs could become prohibitive if there were many market participants.

The net pool mechanism ranks highly in terms of its relative ability to produce transparent and efficient prices and investment signals, and is relatively good at creating competition. One of its other key strengths is its ability to ensure that parties with similar characteristics are treated in the same manner.

Where a net pool market lacks relative strength though is in its practicality and potentially given the depth of the New Zealand market, in efficiency. It ranks relatively highly for a number of key criteria, but there is still a major concern about its practical applicability in a market which is thin in terms of liquidity. As we have repeatedly noted, the market as it exists has low volumes traded amongst a relatively small number of participants, and the size of the economy will be an ultimate restriction on the market's potential growth. There may be growth at the margin, but it is unlikely to be sufficient to enable the sorts of outcomes that have been achieved through pool trading in other jurisdictions internationally. The differences in the number of sources, the number of participants and the volumes being traded are likely to mean that the outcomes possible in a New Zealand context would not be comparable. The net pool mechanism is also clearly the most expensive option to administer and imposes higher compliance costs on participants than the other mechanisms.

The platform bilateral mechanism scores are slightly more favourable than the net pool mechanism in most categories. It is able to create relatively efficient prices and incentives, and creates a high level of information which can be disseminated to both participants and non-participants. It also possesses the same equity traits as the net pool, particularly through the use of standardised contracts and prudential requirements. The platform bilateral mechanism achieves a level of efficiency and contract availability/competitive effects that is superior to the direct bilateral mechanism, without the drawback of potentially not being practical like the net pool mechanism. It would be relatively easy to implement in practice and would be scalable to the New Zealand market.

It is likely that most of the key beneficial outcomes identified from platform bilateral trading overseas could be practically extracted for introduction to New Zealand. The analysis above suggests that, platform bilateral trading is the most likely mechanism of the three considered to create conditions for achieving workable and efficient arrangements for the trading of gas in the New Zealand wholesale market.

Q29: Do submitters believe that the summary of the suitability of the mechanisms above accurately reflects the relative strengths and drawbacks of each of the options as considered? If not, which factors not considered would alter the relative merits of the options?

Appendix 1: Questions for Consultation

Q1	Do submitters agree with the objective defined for this work stream? If not, how and why would you change it?
Q2	Taking into account the conceptual nature of the options at this stage, do submitters agree that these criteria reflect the key measures of suitability of a trading mechanism in the New Zealand wholesale gas market? If not, what criteria would allow a better evaluation of proposed mechanisms?
Q3	Do submitters agree with the characterisation of existing long-term contracts outlined in this section, or are there additional important contract features that should be considered?
Q4	Do submitters agree that there is both a theoretical and practical need for long-term contracts in the wholesale gas market? If not, why not?
Q5	Do submitters agree that auctions, negotiations and posted prices represent the range of contracting mechanisms available for long-term contracting in the New Zealand wholesale gas market? If not, what other options should be considered? Please provide a brief outline of the suggested mechanism.
Q6	Do submitters agree that the key features of each of the mechanisms are captured in this section? If not, what features have been excluded and what impact would they have on the evaluation of the options below?
Q7	Do submitters agree that posted prices should not be considered further? If not, what features of posted prices have not been considered that lead you to this conclusion?
Q8	Do submitters agree with the evaluation of the options outlined above? If not, why not? Please explain what your argument would mean for the conclusions.
Q9	Do submitters agree that there is prima facie no net benefit to be had from formalising or mandating the form of auction by which long-term contracts are established? If not, what benefits of formalisation or mandating, or costs of the existing auction form have not been accounted for?
Q10	Do submitters agree that the mechanisms listed above cover the range of options for short-term trading mechanisms in the wholesale gas market? If not, what other mechanisms are available?
Q11	Do submitters agree that the analysis above accurately reflects the applicability of anonymous/known counterparty and compulsory/voluntary participation to the mechanisms identified? If not, what relevant factors were not identified?

Q12	Do submitters agree with this outline of the key effects of the characteristics of the gas market on mechanisms for short-term trading? If not, what other factors should be considered and how do they affect the viability of the options?
Q13	Do submitters agree that both the clearing house and gross pool options are not likely to be practical mechanisms for short-term trading in the New Zealand wholesale gas market and should not be considered further? If not, please explain your reasoning.
Q14	Do submitters agree that a party-specific limit on the net trading position of participants is sufficient to manage the risk of default? If not, are there other risk management mechanisms that would allow anonymous trading?
Q15	Would submitters prefer a net sell position based on an ability to pay for an underlying quantity of mismatch gas or a pure volume measure? Please explain your preference.
Q16	Do submitters agree with the assessments of the relative advantages of trading at a hub and trading at all welded points outlined above? If not, what other factors should be considered, and how does your argument affect the conclusion?
Q17	Do submitters consider that the other options identified represent the range of potential solutions and that the assessment of them is accurate? If not, please elaborate.
Q18	Do submitters agree that Frankley Road and Rotowaro should be specified as hubs? If not, where do you consider a hub should be and why is it more advantageous than Frankley Road and Rotowaro?
Q19	Do submitters agree with the characterisation of disputes processes, information disclosure and contract standardisation outlined above? Are there any other factors that should be considered?
Q20	Do submitters agree that the characterisation of the contract terms and features of direct bilateral trading outlined above is appropriate? If not, what additional, or different terms should be considered and why?
Q21	Do submitters agree with the assessment of the direct bilateral trading mechanism? If not please explain the nature of your argument and what it would mean for the relative score in Table 4.
Q22	Do submitters agree that the characterisation of the contract terms and features of platform bilateral trading outlined above is appropriate? If not, what additional, or different terms should be considered and why?

Q23	Do submitters agree with the assessment of the platform bilateral trading mechanism? If not please explain the nature of your argument and what it would mean for the relative score in Table 4.
Q24	Do submitters agree that the characterisation of the contract terms and features of net pool trading outlined above is appropriate? If not, what additional, or different terms should be considered and why?
Q25	Do submitters agree with the assessment of the net pool trading mechanism? If not please explain the nature of your argument and what it would mean for the relative score in Table 4.
Q26	Do submitters wish agree that both these options require further consideration? If not, why not?
Q27	Do submitters agree that issues with gas allocation can be resolved separately from the establishment of a trading mechanism? If not, why not?
Q28	Do submitters agree that these issues should be considered further but need not delay the development of the wholesale market? If not, what factors have not been considered that lead you to this conclusion?
Q29	Do submitters believe that the summary of the suitability of the mechanisms above accurately reflects the relative strengths and drawbacks of each of the options as considered? If not, which factors not considered would alter the relative merits of the options?

Appendix 2: Objective and evaluation criteria

Objective

To develop workable and efficient arrangements for the short-term trading of gas (including regulations and rules where appropriate) that satisfy both government and industry.

Evaluation Criteria

In order for the evaluation of options to be transparent and effective, the evaluation criteria need to be clearly defined. The evaluation criteria should include:

- Efficiency.
- Information availability.
- Contract availability and competitive effects.
- Regulatory certainty.
- Administrative and compliance costs.
- Practicality.
- Equity.
- Scalability.

Each of these criteria is briefly outlined below. To the extent that it is possible to quantify the costs and benefits of the options, this will also be done. However, we anticipate that a number of the costs and benefits will not be able to be estimated.

Efficiency

Economists consider a number of measures of efficiency to be important. Key measures are:

- Allocative efficiency – the extent to which resources are allocated to their most valuable use.
- Productive efficiency – the extent to which production occurs at minimum cost, i.e. resources are not wasted.
- Dynamic efficiency – the extent to which investment and innovation occurs efficiently over time.

Some economists consider the third of these to be the most important (and the Commerce Commission agrees). The key question is whether the option being considered distorts the incentives faced by parties to invest, or undertake risk mitigation activities.

Information Availability

The key requirements for information in a well-functioning market are that the information is complete, is available to all parties and is provided in a way that can be comprehended by the parties.

In evaluating options it will therefore be important to determine the extent to which the proposed approach ensures high quality accurate information is equally available to all participants in an equitable, timely manner. In addition, the extent to which the approach

facilitates the development of appropriate risk management skills on the part of participants should be considered.

Contract Availability and Competitive Effects

The key to meeting this criteria is the extent to which the proposed approach will increase liquidity in the market. In other words, are contracts readily available at transparent prices; are the contract terms standardised; and has credit risk between parties been addressed? To what extent do parties still face transaction costs associated with entering a contract?

One of the purposes behind the government's interest in the gas industry is to minimise barriers to competition and provide access to competitive market outcomes. One of the evaluation criteria should therefore go to the outcome in terms of whether the level of participation is (likely to be) increased as a result of a proposal, and whether greater levels of competition amongst participants can be expected. This will require consideration of the likely effect of the proposal on the volume and type of contracts offered and parties' risk exposure.

Regulatory Certainty

One of the factors that decision-makers take into account is the extent to which future, unknown changes in regulatory policy or approach could limit the returns to a decision. In terms of a long-term investment a higher probability of regulatory change will increase the risk premium on the investment. In other words, the investor will require a higher return in order to be willing to accept the risk associated with the investment. In the context of the design of the wholesale gas market, the relevant question is: to what extent does the proposed approach meet the objectives of the GPS and further regulatory certainty.

Administrative and Compliance Costs

One of the sometimes-overlooked groups of costs associated with regulation is the administrative costs imposed on the regulatory body and the compliance costs imposed upon participants. The extent to which a proposed approach imposes such costs should be considered a relevant evaluation criterion.

Practicality

The importance of identifying whether a proposal can be practically implemented should not be underestimated. At a broad level, does the proposal square with international experience? Is it compatible with the overall structure of the New Zealand energy market?

It is also important to reflect the risk of mid-stream changes to the regulatory framework (this is related to the earlier criteria of regulatory certainty). What is the likely timeframe for implementing the proposal? What is the risk that the implementation will not be completed or will be imperfectly implemented (perhaps because only elements of the proposal are achieved)? Where relevant, these considerations should include the practical logistics of being able to transport the gas being traded.

Equity

The economic principles of equity demand that parties with the same amount of a relevant characteristic are treated in an identical fashion and that differences are treated in a way that is in proportion to the difference.

Relevant questions in terms of the equity of a proposed approach could relate to such issues as the differential treatment of parties by size, by position in the supply chain, by reference to historical information or by the type of use to which the gas is put.

Scalability

The New Zealand gas market is currently characterised by a limited number of players and a limited volume of gas that is likely to be traded. It is important that the market is designed appropriately to the current proportions of the gas industry. However, it is also important that the market be able to grow in terms of the number of participants and volume of trading over time. In addition, it is important to consider whether diversity of supply or interconnectivity of pipelines (or number of pipeline owners/operators) is a barrier to growth.

The relevant question then is: are there any barriers to expansion of the approach being considered to deal with a more complex or larger market?

Appendix 3: Gas market characteristics

In designing a wholesale gas market, as in other markets, a key goal is that of efficiency – be it allocative, productive or dynamic. Each of these elements contributes to ensuring that signals and incentives are clear to existing and potential market participants and that opportunities to increase economic welfare are taken.

In working towards this goal for the gas market, the development needs to be cognisant of a number of key drivers of efficiency – the key being the characteristics and features of the market itself. While other factors such as the design of rules for the operation of the market are clearly essential, it is the recognition and incorporation of the non-regulatory physical characteristics and features of the gas market that are pivotal to satisfying the criteria for successful market design.

Along with consideration of how these features need to be incorporated into the design of the wholesale market, it seems useful to re-iterate the need of the design to be flexible and adaptable to changes in these key characteristics and features. We need only consider the last decade to remind ourselves of the significant changes experienced in the gas industry, and hence the importance of balancing the need for structured formal mechanisms, while maintaining flexibility and scope for change.

This paper briefly outlines some of the key characteristics and features of the New Zealand gas market, which will need to be considered in the overall design of the wholesale market.

Market Structure and Density

The structure of the gas market, and the density of participants in that structure, is a key characteristic to be considered in the design of the wholesale market.

Within this, there are a number of key considerations in a New Zealand context:

- **Supply and vertical integration** – the existing market is fairly concentrated in terms of production, with a relatively limited number of organisations involved. This does not necessarily indicate any issues around the level of competition inherent in production, but it will drive, for example, the type of contracts which are offered to buyers in the wholesale market. Similarly, the number of wholesalers is not large – again a factor which will affect other conditions in the market, such as the level of information disclosure and the terms and conditions available to purchasers of gas from these wholesalers. Also, some participants are vertically integrated to different extents, being involved in a number of levels in the supply chain.
- **Contracts** – the nature of the supply side and the demands of certain downstream users means that the market will likely require long-term bilateral contracts to enable both parties to secure or cover their position, and to ensure that incentives are in place for investment to occur. They allow generators, for example, to fix some costs regardless of the upstream structure. These contracts however, are unlikely to be exactly to the buyers' requirements, so such buyers are likely to seek to trade gas to manage their gas position.

- **Demand side participants** – the demand side exhibits a similar lack of density as the supply side, in that the bulk of gas demand is attributable to a relatively limited number of users (large industrials and generators). In 2004, 5% of consumers (those classified as commercial and industrial users) accounted for around 96% of consumption[38].
- **Absence of gas brokers** – a characteristic which is absent from the New Zealand market is the use of gas brokers. While some participants in the New Zealand market have acted to aggregate gas from a number of sources (such as NGC's 'gas gathering') we are not aware of any formal gas brokering operations.
- **A 'thin' market** – the lack of density in terms of both demand and supply is a natural constraint on the level of trading and liquidity that can eventuate. While being constricted by the depth of trading[39] and resulting liquidity, a more over-arching constraint is size of the New Zealand economy within which the gas market operates. The scope of the economy only permits a certain market size; hence there is an effective 'cap' on potential growth in the depth and liquidity in the wholesale market.
- The lack of density in the structure of the market can be contrasted against other jurisdictions with relatively high levels of liquidity in the following table. The scope for growth in the level of liquidity will ultimately be restricted by the size of the potential pool of buyers and sellers.

Table 5 Density of supply and demand

	Number of customers	Number of suppliers
New Zealand	Approx. 240,000*	Producers: 8 Transmission: 2 companies Distribution: 5 companies
Australia	Approx. 3.4 million	Producers: 12 Transmission: 8 major companies Distribution: 8 major companies
United Kingdom	Approx. 20.99 million	Producers: approx. 50 Transmission: 90 major companies
United States	Approx. 60 million residential, 5 million commercial, 0.235 million industrial	Producers: 24 major[40] Distributors: approx. 1,600

Note: * estimate based on the most recent information disclosures (235,000), allowing for some estimated growth

Source: Adapted from: Charles River Associates - *The implications for governance of the distinctions between gas and electricity*, Jan 2004.

38 Ministry of Economic Development – *Energy Data File,* July 2005

39 Both in terms of the volume of trading that occurs, and the number of players.

40 Over 8,000 in total

Fuel Supply - Accounting for History

The potential deficit between the demand for, and the supply of, domestically sourced natural gas is well documented, but is an important characteristic of the market which may have both a transitory and an ongoing influence on whatever design is applied to the wholesale market.[41]

The reliance on the Maui gas field for over 20 years as the primary source of indigenous natural gas had natural flow-on effects:

- The size of the field limited the market price for natural gas (as did the price escalation clauses in the Maui contracts)
- Many industrial and commercial operators invested in capital equipment set up to run on natural gas
- Electricity prices were heavily influenced by plentiful domestic natural gas reserves and Maui prices
- The ability of other fuels to compete with 'cheap' natural gas was restricted
- The incentives to explore and extract natural gas from other fields were suppressed

The attenuation of gas reserves under the original Maui contracts ("legacy contracts") means that as we move toward an era of more fractured supply of natural gas from a more diverse range of fields, the consequences of the flow-on effects outlined above are coming to fruition in that:

- Contract prices for natural gas have increased significantly
- Some major industrial users of gas have restricted or ceased operations as a result of an inability to source natural gas at prices they consider to be cost effective. The use of dual-fuel equipment is increasing
- We have witnessed a 'step' in electricity prices, as generators have needed to secure higher priced thermal fuels, as well as needing to introduce/substitute toward higher cost alternative fuels for generation
- The potential shortfall of gas has helped contribute to high levels of exploration
- The flexibility available through contracts has been considerably reduced, with a shift in balance toward more fixed costs (as opposed to costs which vary with volume consumed)

As we noted in the introduction, while the design of the wholesale market will not necessarily take direct account of some of these impacts and events, it will need to ensure that these characteristics fit within the design that the wholesale market takes.

Fuel Supply – Future Supply Scenarios

As well as considering these historical fuel supply issues, the design must be flexible to enable future fuel supply scenarios to be taken account of.

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[41] While there is the potential for a shortfall of domestic natural gas, the shorter term gas supply situation (i.e. day to day, seasonal) is more complex. For example, in the summer months it may be the case that there is a considerable amount of excess supply due to low seasonal demand.

For example, the potential importation of Liquefied Natural Gas (LNG) into New Zealand to act as a backstop, should sufficient indigenous natural gas not be available, is a scenario that must be catered for in the design. Again, the design need not be hampered by these scenarios, but should not restrict them from fitting within the design framework. This is a particularly important point for the development of the New Zealand market, given the uncertainty around the future levels of domestic natural gas.

Market Location

An efficient market design will need to be mindful of the remoteness of the New Zealand gas market compared to major trading centres, as well as to other countries who may hold significant natural gas reserves.

The remoteness of the New Zealand market impacts on the cost effectiveness of imported alternative fuels. In this regard, it would seem that the market design framework should effectively treat imported natural gas as if it were a domestic supply, in that it is simply gas injected into the transmission system at an alternative location.

Fuel Supply Impacts on Flexibility, Balancing and Contracts

While the market design need not take direct account of the issues outlined in the section on future supply scenarios, it does need to incorporate some of the effects the change in supply has had on the amount of supply flexibility available, the resulting impacts on balancing, and the match between contracts being offered and those sought by users.

The level of Maui reserves has historically provided high levels of flexibility to users. Intraday swing capability for example (the difference between peak to average within a day) has been high because the Maui pipeline was dedicated to a single field. The buyer simply bought everything they required from the field. As the reserves available from Maui under the legacy contracts attenuate, the level of flexibility available will decline, and we are already witnessing this in the market. Shippers are more likely to be required to make their own balancing arrangements, and the tools available to correct imbalances will be more limited than they have been in the past – as well as more expensive.

The reduction in flexibility has, and will continue to also impact on the ability of industry participants to offer contracts with the levels of flexibility sought by end users. Anecdotally we are aware of more inflexible 'take' provisions in new contracts to help offset risk to the provider of the contract. This is likely to mean an increase in any differential that exists between the pattern of demand for gas (on a daily basis, and longer) and the ability of supply to match, given the must-take provisions which apply during periods of low demand.

The effect on the ability of users to balance their withdrawals and injections, as well as the impact on the match between the contracts on offer, and those sought by users will clearly be important issues for incorporation in the market design.

Natural Gas Pipelines

The characteristics of the existing and potential pipeline infrastructure are important for the development of an efficient market design.

- As with other jurisdictions, the nature of New Zealand's transmission system as either a point-to-point system, or a as a grid/lattice system will have impacts on

both the level and frequency of trading capacity and potentially gas. New Zealand's system is effectively point-to-point.

- The low level of linepack available (and thus limited in-pipe storage) has some effect on the ability of users to manage imbalances.
- The operation of the Maui pipeline and the NGC pipeline has clearly had, and will continue to have a large impact on the wider market design, as well as potential considerations for the wholesale market design. In this regard, a number of features will need to be considered in terms of their potential impacts:

    The parallel sections of Maui/NGC pipelines

    The practical technical capabilities of both pipelines

    The consistency of access arrangements

    The pricing of transmission services

    The ability to obtain capacity, and the method for allocating and trading capacity

    Gas allocation arrangements at points of interconnection between the two pipelines

    Reconciliation arrangements at delivery points from the NGCT system

    Management of pipeline operation, including scheduling, balancing and metering

Security of Supply

Gas “fails to danger”, which is to say that if supply is interrupted, gas can escape and cause fire and explosion risk. If pipeline pressure falls, then air or water can enter the pipeline and cause damage or explosion. This means that safely shutting down customers is difficult; for small customers the cost of shutting down and relighting is prohibitive. For large customers interruptible supply may be able to be safely organised.

Traditionally, the safe delivery of gas has been ensured by vertical integration, industry co-ordination, long-term contracts and government oversight.

It will clearly be essential to ensure that co-ordination for safety is maintained under any market design. International experience has been mixed in terms of incentives created by different market mechanisms and the associated risk and safety considerations. In general, poorly functioning markets have been blamed for increases in risk in transmission systems.

The National Gas Outage Contingency Plan (NGOCP) has been the mechanism in New Zealand, but some parties are seeking to have a market mechanism replace it.

Prudential Issues

Credit risk will increase with the increasing competition and complexity of relationships as we move toward a post-Maui environment and will be a key issue for the development of an efficient market design.

For example, in the past credit risk was managed through long-term contracting and legal franchise areas that protected the incumbent retailer from competition. A financial failure by a retailer in a deregulated market, with competition for end-consumers and short-term or spot gas trading, could cause third party effects.

Potentially the retailer's customers could continue to draw gas from the system without any matching injections. Given that small customers cannot be safely interrupted, large customers, who may not belong to the failed retailer, may have their load shed as pipeline pressure falls, in order to ensure the safety of the system.

Appendix 4: An Overview of Selected International Gas Markets

This appendix examines gas markets operating in other jurisdictions, and thus gives insights into how markets are structured, and how each markets' particular characteristics are allowed for in that structure. These international markets provide us with examples of how certain processes operate in practice, and in some cases identify pitfalls which have necessitated restructuring. This can help in developing the design framework for the New Zealand gas market.

Initially, summaries of selected international gas markets are presented. These include:

- The United Kingdom;
- The United States;
- Australia – Victoria;
- Australia – the remaining states; and
- Singapore

Following these summaries, a number of issues pertinent to the development of the New Zealand wholesale market are considered in terms of how they are dealt with in the countries' examined.

The United Kingdom

The market for natural gas in the United Kingdom has developed into the largest in Europe, having undergone considerable reform since British Gas was initially privatised in the mid 1980's. Since then, British Gas' positions in production, transmission and retailing have been separated and reduced, with a major dissemination of roles in 1997.

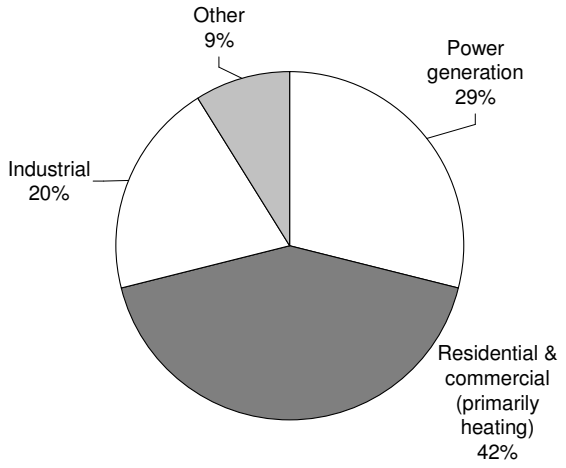
Around fifty companies are involved in the production of gas, with the four major producers supplying more than half of the gas consumed domestically. There are approximately 90 shippers. Rather than a point-to-point system, the pipeline system that operates is grid like in nature, with multiple routes possible between points of injection and offtake points. Gas can be injected into the system from a number of sources, including from Ireland or other European providers via interconnectors or from one of the five LNG terminals. Despite the grid system in place, gas storage facilities are fairly limited. While the LNG plants provide some storage capacity, the actual pipelines are fairly limited in terms of available capacity, hence limiting its role in balancing.

Demand

The majority of the natural gas available for consumption in the United Kingdom is consumed by the residential and commercial sectors, primarily for heating. The other uses of significance are for power generation and for industry, with shares of consumption of around 29% and 20% respectively.

Figure 4 Shares of demand for natural gas in the United Kingdom

Demand - 2001



Source: ABARE 2003

The Wholesale Market

Prior to the major restructuring of the 1990's in particular, gas was primarily traded via bilateral contracts. The introduction of the Network Code for market participants and the subsequent changes to the roles of participants in balancing demand and supply meant that other forms of trading gained prominence. This included the development of spot markets at a number of points onshore, where gas is delivered to the National Transmission System (NTS) from offshore, and trading on the pipeline system or 'On-system trading', via a single notional delivery point.

Spot market trading has assisted in the standardisation of terms and conditions in gas contracts, and is typically undertaken on a brokerage basis or via bilateral contracts.

On-system trading occurs at the Notional Balancing Point (NBP) and effectively operates via a 'pool' model where day-ahead transactions are made for shippers with pipeline capacity from the NBP (to their delivery point) to purchase gas from those with capacity to ship gas to the NBP. It is at this point that the high pressure system is balanced. Trades of around 20PJ per month are made via the NBP.[42] The NBP's central location and accessibility aid in keeping transactions costs low for those trading at this point.

The Network Code for gas also provides for on-the-day commodity market (OCM) trading. This is a 24 hour a day, anonymous trading system where bids and offers are posted by shippers for gas to be traded at either the NBP or specific points on the system. A primary function of OCM trading is to allow shippers to better manage their imbalances between actual injections and withdrawals and hence avoid imbalance penalties. OCM trading is run by an independent operator, EnMO.

[42] ABARE, Dec 2003, p.28.

Transmission

The onshore transmission system is operated by a sole independent owner/operator in British Grid Transco (BGT). Its operations (including investment and pricing) are subject to a regulatory and legislative regime, with a requirement that its services are provided in an unbundled manner. The Network Code provides a vehicle for the operations of BGT, and the requirement that license holders must be parties to the Network Code mean that a common set of rules is applied to all participants.

BGT derive a schedule for gas flows upon receipt of nominations from shippers, who are required to provide day-ahead estimates of injections and withdrawals. Any imbalances resulting from shippers operating outside of these nominated quantities are monitored by BGT, and to a certain extent they can manage these imbalances through the use of (relatively limited) linepack, or by trading gas within-days. The costs associated with performing these balancing duties are allocated to the appropriate causer of the imbalance; hence there are incentives for shippers to provide accurate nominations and to operate within set tolerances for imbalance.

Capacity Allocation and Trading

A requirement of shippers is that they have sufficient capacity to meet the peak aggregate demand of their customers for gas on the coldest day expected in a period of 20 years.[43] Various auctions are held in order to allocate this capacity to shippers:

- Daily auctions of firm, interruptible and 'use it or lose it' capacity. These may indicate the expectation of 'spare' capacity in the system on a particular day, or the need of BGT to buy back capacity if it has been oversold
- Biannual auctions for six month tranches of 'monthly system firm entry capacity' (MSEC) which ordinarily entitle capacity for at least one month
- Auctions of six month tranches of monthly interruptible capacity

The capacity auctions are facilitated by BGT and are a useful way to allow shippers to minimize their exposure to high charges for operating outside of their allocated capacity. Shippers can also on-sell their capacity to other shippers, either directly or through a formal posting process with bids and offers for the capacity. Once completed, the relevant information is provided to BGT who update the capacity positions of the affected shippers.

Balancing

The Network Code requires daily balance of injections and withdrawals for shippers, within set levels of tolerance. Outside of these tolerances, penalties are charged, or credits awarded if the shipper withdraws more or less than their injections respectively.

As noted earlier, BGT is able to use within-day gas trading and linepack to manage imbalances to a certain extent, but the OCM trading market allows shippers more involvement in balancing their own operations. The OCM is the main source of balancing gas for shippers (both for BGT and other shippers), and allows trade in 3 different markets:

1. A title market - trading at the NBP

[43] ABARE, December 2003, p.29.

2. The locational market – allows BGT to buy gas to solve local transmission constraints and imbalances
3. The physical market – BGT can purchase gas at any point for immediate physical delivery

Trading on the OCM sets the cash-out prices which form the commercial incentives for shippers to balance in and off-takes at the end of the gas-day.[44] Imbalances which sit within the tolerance levels are charged at the System Average Price (SAP) which is derived from the average prices of all OCM trades. Imbalances that fall outside the tolerances are charged out at the System Marginal Sell/Buy Price (SMP sell/SMP buy) if the shipper has to buy gas or has input too much gas resulting in the imbalance. The SMP sell and SMP buy prices reflect the lowest and highest priced Transco trades respectively.

Scheduling charges are also incurred by shippers where differences exist between quantities nominated and actual flows.[45]

The United States

The market for gas in the United States is both deep and large in absolute magnitude, being the largest in the world. In 2001 gas consumption in the United States exceeded 24,000 PJ. While domestically sourced natural gas in supplied from around 8,000 different producers, the majority is supplied via 24 major producers. The depth of the market extends through the full supply chain, with around 100 operators of storage facilities, over 60 interstate pipelines and over 1,600 distributors.

Demand

As in the United Kingdom, the majority of the natural gas available for consumption in the United States is consumed by the residential and commercial sectors, primarily for heating. The other uses of significance are for power generation (30%) and for industry (22%). There are however, significant variations in demand by various users across states, varying considerably depending on the composition of the economy. The significant variations extent to the patterns of demand, with daily and seasonal variations creating opportunities for trading to occur between participants, and thus for increasing allocative efficiency.

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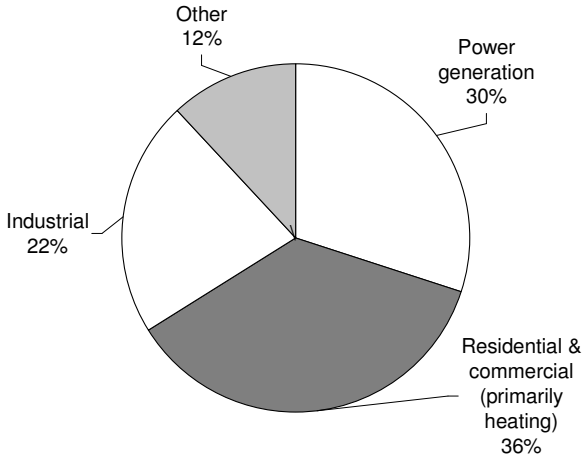
44 ABARE, December 2003, p.29.

45 As opposed to charges for imbalances which reflect differences in the amount injected and taken out of the system – irrelevant of the nominated quantities.

Figure 5 Shares of demand for natural gas in the United States

Demand - 2001



Source: ABARE 2003

The Wholesale Market

Bilateral contracts dominate the market for natural gas in the United States, and it is often considered a seminal example of the bilateral contracts model. Federal regulations requiring that services be provided in an unbundled fashion also mean that the wholesale market is clearly separated into a market for natural gas as a fuel, and for transportation of natural gas.

Trades for gas occur most frequently at market hubs – points on the transmission system where pipelines join and gas is able to be transferred from one system to another. Trading at these hubs involves shippers with capacity to the hub selling to shippers with capacity out of the hub, with pricing generally tied to publicly quoted gas prices at major hubs. Henry Hub (Louisiana) is the most well known, and largest, trading hub. The large number of trades and the depth of trading, means that the market is fairly vibrant and liquid. Gas buying cycles are typically monthly, although gas is also traded for next-day delivery. Some intra-day trading also occurs, typically as a maximum daily quantity (MDQ) for a set period.

The large volume of trades means that a voluntary system of reporting such trades is able to operate. Pricing services publish locational prices at market hubs daily, and sometimes hourly. Regulatory intervention is in place to ensure the integrity of published prices, as issues arose in recent years as to the authenticity of the price information being published. Reporting is still voluntary but the information submitted is required to be factual, accurate and complete.

The New York Mercantile Exchange operates a transparent natural gas future market for gas delivered to Henry Hub at specific dates.

Transmission

As noted above, federal regulations ensure that interstate services for natural gas are unbundled, however many companies provide retailing and marketing service via legally separate entities.

Transmission services are provided on an open access basis, with pricing for interstate services being set by the regulator (FERC). The involvement of the regulator in pricing, and the high levels of competition help ensure that prices between hubs do not tend to deviate by much more than the cost of transportation services between the hubs.

Capacity is sold under long-term contracts specifying receipt and delivery points for the capacity in questions. Pipeline owners require that a shipper's total injections at a receipt point equal total off-takes at the delivery point specified i.e. they are balanced.

Capacity Allocation And Trading

Capacity on the system can be purchased on an interruptible (IT) or firm basis (FT). FT has the highest priority in terms of transmission rights (for specified receipt and delivery points), with contracts typically for 10 to 20 year periods. The differentiation between IT and FT helps manage capacity, given that there are areas where constraints do occur. Most capacity on interstate pipelines is held by distribution companies under FT contracts.

Prices for capacity are again limited by the regulator. Pipeline owners can discount prices if they wish (below the regulated levels) but where discounted prices are agreed, they must be published. Discounts are more often applied to interruptible load. In terms of price variation for IT versus FT capacity, IT rates are rolled into a single per unit transportation rate i.e. they pay no separate reservation charge; it is a fully variable rate.

Electronic bill-boards (EBB) have been established by pipeline owners to facilitate trading of pipeline capacity (called 'capacity release) as required under federal regulations. Capacity held by shippers can be re-sold on a bilateral basis or via the EBB (on a daily basis or longer). Pipeline owners also publish their available capacity via the EBB, inviting potential shippers to bid on the available capacity. The successful bid for the capacity is the one with the highest NPV –the tariff rate multiplied by the time period requested. No futures market exists for pipeline capacity (as it does with NYMEX for natural gas).

Balancing

Balancing is performed by pipeline owners through commercial contract agreements, with a set of industry rules and norms for balancing (within certain tolerances) in place to ensure consistency across these contracted agreements.

Penalties for operating outside of these tolerances usually relate to compensation to the pipeline owner for use of line-pack and are thus ex-post. Requirements for balance in terms of injections and off-take are typically a daily function; however balancing periods do range from daily to monthly.

Some contracts specify nomination divergence charges (as well as charges for the cost of rectifying imbalances) which are analogous to scheduling charges. These are incurred where nominations vary from quantities actually used (again there are usually levels of tolerance). These can be on an hourly basis in some cases.

Australia - Victoria

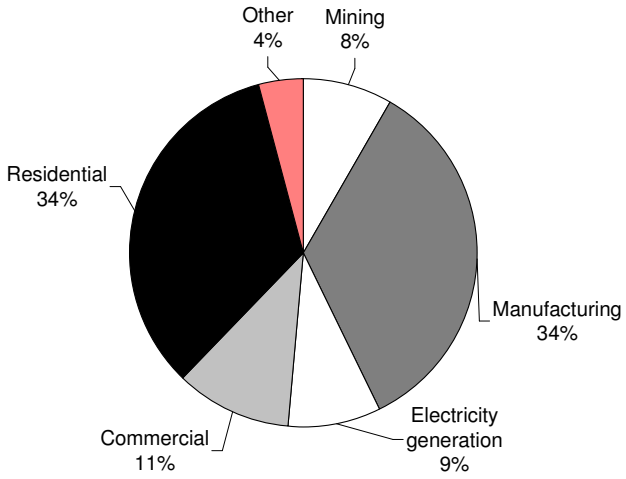
The market for natural gas in Victoria is unique in comparison with other Australian states – largely because of the system of market carriage employed in terms of access to capacity. Rather than parties being able to obtain property rights to pipeline capacity and receiving reserved capacity, charges are based on actual use and all access is on a non firm basis.

The market is also relatively unique (compared to other Australian states) in terms of the multiple injection points for natural gas. Gas enters the system from a processing plant, underground storage, from an interconnection point with Victoria (VicHub) and also from an LNG facility. This characteristic is primarily responsible for a transmission system which is more grid-like than the point-to-point systems which exist in countries like New Zealand. The multiple injection points also create a relatively unique feature in that gas is able to flow in both directions on most sections of the high pressure system.

Demand

Figure 6 Shares of demand for natural gas in Victoria, Australia

Demand – 2001/02



Source: ABARE 2005

The Victorian market accounts for around 250 PJ of natural gas per year, with demand being highly sensitive to weather for domestic users. Residential use of natural gas accounts for over one-third of total consumption, with manufacturing accounting for another third. The presence of mining facilities in the state results in around 8% of consumption being used by the mining industry.

The Wholesale Market

The wholesale market is covered by the Market and System Operations Rules (MSO), which also extend to cover transmission services. VENCorp, the government owned independent system operator operates and administers the wholesale market in Victoria.

The majority of gas is traded via bilateral contracts between producers and retailers, but spot markets do exist to balance supply and demand for gas through competitive bids-effectively a pool. The spot market allows for trading of imbalances automatically.

The spot price is determined by stacking participants' offers or nominations in order of prices, and cleared against total demand (ex-post) in a similar manner to the NZEM generation 'stack'. The market price is set by the highest price gas scheduled for the day. The price is capped at a maximum 'value of lost load' (VOLL). An administrative price cap also comes into play under *force majeure* events.

VENCorp publishes market information on its Market Information Bill-Board (MIBB) for participants, including operating schedules, forecast prices, reschedules etc. They also publish information for the general public on their website including final operating schedules, forecast and actual spot prices, aggregate withdrawals and injections.

Transmission

Victoria's main high pressure transmission system is the Principle Transmission System (PTS). While VENCorp is the independent system operator, it does not own the pipelines. Charges for transmission services are set and published by the transmission owner. Pipeline revenues are regulated with a cap on total revenues that can be earned by the owner of the pipeline.

In terms of a schedule being developed for dispatching gas through the transmission system, prior to the gas day, shippers submit nominations to VENCorp or make increment/decrement offers. These offers are price related offers to increase or decrease injections or withdrawals in response to price at specific connection points, should the market price reach a particular level.

In some situations, VENCorp may require additional injections of gas to meet changes in demand, outside of those allowed for in the schedule. When this occurs, VENCorp may require injections which are offered in at a price which exceeds the spot price. They do so by making 'ancillary payments'. The supplier of the additional gas is compensated for the difference between their offer price and the spot price via the ancillary payment, and these are recovered (as far as practicable) from the participants who necessitated the injection via 'uplift charges'. The allocation of the uplift charges amongst participants is determined by monitoring those who have exceeded their Authorized Maximum Daily Quantity (AMDQ) entitlement.

Capacity Allocation and Trading

As noted earlier the Victorian natural gas market operates a system of market carriage, whereby participants don't contact for pipeline capacity but simply submit nominations to inform VENCorp of expected usage. Participants then simply pay charges for the actual gas flowed during that day. This is primarily a result of the capacity of the PTS being sufficient to supply all consumers' daily gas requirements for all but a few days of the year.[46]

[46] Despite this, the system only allows for a relatively small amount of linepack compared to daily peak demand.

If for any reason there were capacity constraints or a need to reduce gas being transported in the system, the AMDQ operates determines the ranking for whom will lose capacity first. A customer's AMDQ can be negotiated with other entitlement holders or by contracting with pipeline owners to provide additional capacity.

Balancing

Given that the spot market which operates is a net market, participants pay for excess withdrawals over injection (or vice versa) on a given day. At the end of each day the imbalances are determined by VENCorp, and each participant's payment (or receipt) is settled at the daily market price (determined from the stacked offers and nominations).

Australia – other Australian states (New South Wales, Queensland, South Australia, Western Australia and the Northern Territories)

The Australian states other than Victoria can be thought of as essentially state markets in and of their own, although they have functions which are similar enough to allow consolidation of their structures for our purposes in this report.

An important feature of the gas market in these states is the National Gas Access Code which parties may or may not be covered by. All pipelines existing at the time the code was enacted are covered, but some new pipelines are not covered.[47] The Code dictates a number of conditions on the market (those covered by it) which are describe further below.

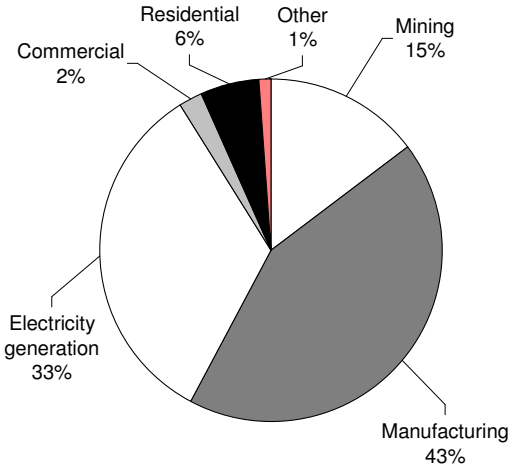
Demand

As we would expect, the composition of demand by major use for all states in Australia other than Victoria differs significantly from that for Victoria. Most noticeably, the share of natural gas consumption for electricity generation is much larger for other states (33% compared to 9%) but the share of demand for residential purposes is much smaller for other states, than it is for Victoria (6% compared to 34%). Use of natural gas for mining is also larger for states other than Victoria. Total demand for natural gas in 2001/02 for these other states was around 725 PJ.

[47] Charles River Associates, January 2004, p.41.

Figure 7 Shares of demand for natural gas in Australia (states other than Victoria)

Demand – 2001/02



Source: ABARE 2005

Wholesale Markets

In the main, the purchasing of gas in states other than Victoria is carried out via long-term bilateral contracts with producers. Take-or-pay arrangements are a dominant feature of such contracts. Short term trading does occur in gas trades, but this is typically carried out on a similarly bilateral basis, with little or no disclosure of contract terms or conditions to other parties. The low level of transparency is a relatively common feature across all the other states. The contract conditions; namely price and quantity, are likely to vary considerably both between, and within states.

Transmission

The structure of transmission services across states other than Victoria differs quite considerably in terms of the nature of the pipelines, but services are typically provided via long-term bilateral contracts as in the wholesale markets. The bilateral contract arrangements will typically denote tariffs which can be charged, as most pipelines in operation pre-date the maximum tariffs set under new access arrangements. New pipelines (i.e. those that have come into operation since the introduction of the Natural Gas Access Code) can be either regulated, or have tariffs set by negotiation.

Capacity Allocation and Trading

Capacity access in the transmission system is allocated via a contract carriage model, where (as noted above) long-term bilateral contracts set out conditions for shippers to access pipeline capacity with little transparency for third parties. Again, most pipelines in operation are covered by the Access Code.

Only as the existing pipeline contracts expire can access arrangements from the Access Code come into affect, as the Code is not allowed to supersede any previous commercial agreement.[48]

Access arrangements covered by the Access Code are required to outline a number of key conditions:

- Basic conditions for access by the shipper
- Arrangements for expanding the pipeline
- A requirement for capacity trading arrangements
- Provisions for capacity not in use (interruptible haulage)

These conditions are established by the owner of the pipeline but are subject to approval by the ACCC. This process includes a consultation component. The Access Code also allows for the trading of contract capacity between shippers, but again the conditions under which this occurs are typically restricted to the contracted parties, with little transparency for other participants.

Balancing

The balancing functions carried out in the various states have a common element in that they too are typically carried out through bilateral contracts, and are usually managed by the pipeline owner according to these terms.

Singapore

Restructuring of the natural gas market in Singapore was instigated following on from liberalization of the electricity market in the mid 1990's. The electricity sector is by far the biggest user of natural gas. The market relies predominantly on imported natural gas from Malaysia, West Natuna and South Sumatra.

The restructuring of the existing industry has involved a number of key tasks (a number are ongoing), fundamental to the development of a stable new market to support the restructured and liberalized electricity sector, namely:

- To convert the existing town gas networks (both distribution and transmission) for use with natural gas
- The separation of gas transportation from other contestable sectors: gas importing, retailing and trading
- Introducing a system operator

The Energy Market Authority (EMA) was formed on April 1st 2001 as a statutory board under the Ministry of Trade and Industry to be the regulator for the gas and electricity sectors in Singapore.[49]

The Wholesale Market

Given the small relative size of the market, and its level of maturity, bilateral contracts are expected to dominate gas imports into Singapore. A real time market will allow trading via

[48] Charles River Associates, January 2004, p.41
[49] http://www.igu.org/members/developm_2003/Singapore.pdf

incremental and decremental bids however. In this process, the price paid to a provider of gas is based on the highest price incremental/decremental bid used in the settlement period of one hour.[50]

Transmission

PowerGas was selected as the designated gas transporter and takes on the role of system operator after having divested its other interests in importing and retailing as part of the restructuring. PowerGas will operate a single integrated and regulated network providing open non-discriminatory access to all shippers. Transmission services are simply based on receipt and delivery points, and the capacity being occupied. The nature of the transmission system means that very little linepack gas is available for balancing purposes.

Capacity Allocation and Trading

Capacity rights to the transmission network are obtained from PowerGas, or they can be traded with existing holders of capacity. New capacity will be at the users' expense through a concept called 'open system' whereby the market drives investment decisions around extending pipeline capacity.

Contracts for capacity can be either be for firm or interruptible capacity, for specific receipt and delivery points. Interruptible capacity is only scheduled where sufficient capacity exists on the system.

Balancing

PowerGas is set to use an IT system (the Gas Transportation IT Solution System or GTSS) to facilitate the balancing of gas transportation and to administer capacity trading and transportation charges. The GTSS is based on the Network Code, which is a multilateral contract between the transporter and shippers.

PowerGas can monitor the system to check on the balancing position, and can use the incremental/decremental bids to help adjust for balance. The shippers who necessitate the calling in of the bids can trade their imbalances with other participants who have opposite balances, or have them cashed up at the marginal incremental/decremental price. A pre-set price related to the price of fuel oil is used to price imbalances if no incremental/decremental bids are used in balancing.[51]

Relevance to the New Zealand Market

In the sections above we identified key features of important and relevant international gas markets. In this section, we consider a number of potential issues for development of the New Zealand wholesale gas market, in terms of how applicable the approaches of other jurisdictions are.

Non-regulatory Determinants of Market Structure

The structures of the markets examined above are typically influenced by one or more major characteristics of the jurisdiction, rather than solely by the direct regulatory settings.

[50] ICF, September 2003, p.18.
[51] ibid, p.17.

These characteristics tend to reflect the geographical features of the state/country, the population base, as well as other factors affecting scope.

For example, the market in Singapore will always rely on imported natural gas, given its geography. The Victorian market is similar in that its position – adjacent to New South Wales but also its coastline position – means that gas will typically be sourced from a number of diverse sources. These features also extend to the availability of domestically sourced gas, and the resulting reliance on other producers.

The issue of scope means that markets such as the United States will always be highly influenced by the huge numbers of participants and vast distances which the gas can be transported. Conversely, the market in Singapore is restricted by a relatively small residential base and small number of potential market participants.

In terms of the New Zealand wholesale market context, a number of key non-regulatory features will need to play a major role (both in transitory terms, and dynamically) in how the market is structured and how it operates, including:

- The (physical) isolation of New Zealand from major trading centres
- The uncertain domestic supply of natural gas
- The high likelihood of a relatively small number of market participants (both buyers and sellers) under most scenarios
- The existence of Maui legacy contract arrangements
- Limited flexibility under 'new' gas contracts
- The likely shape of long-term contracting arrangements

Bilateral vs. Pool Markets

The United Kingdom and the United States provide fairly contrasting market structures, with pool and bilateral systems dominating the respective markets.

In the United States, the absolute size of the market and the large number of participants mean that a bilateral contracts market can be effective in encouraging and nurturing competition in most functions in the supply chain, and helping to ensure that prices are efficient. This also means that a system of voluntary reporting can operate successfully (although some regulatory intervention was required to ensure pricing information was reliable). The importance of low transaction costs is also a feature of bilateral markets, and markets where search and transaction costs are low will tend to exhibit higher levels of competitive outcomes.

In New Zealand the existing model for (both short and long term) gas trading is also dominated by bilateral contracts, but the lack of scope means that information for third parties is not forthcoming, and a significant lack of transparency about the terms and conditions of contracts can create some barriers to entry for potential new entrants to the industry.

Consideration of the New Zealand market will also have to factor in the likelihood of continued use of long term bilateral contracts to underpin investment, if supply shortfalls materialise to the extent predicted by many in the industry. Clearly, both parties (sellers and buyers) will be seeking to mitigate risk in terms of their exposure to a potentially

limited supply of gas, but we need to ensure that conditions for both parties are still considered 'reasonable' and ideally consistent also.

The pool model operating in the United Kingdom and Victoria works well in systems where a denser network structure exists and is often accompanied by multiple sources of supply (such as the four sources in Victoria). Successful operation requires considerable amounts of information to be available to all market participants, and both the Victorian and United Kingdom markets are good examples of this. The presence of the information aids in lowering transaction costs, and the use of a Notional Balancing Point (NBP) in the United Kingdom ensures a central accessible location for trading to occur. As in New Zealand, both markets possess low levels of linepack for use in balancing gas flows. Consideration of a NBP type pool model in New Zealand (even a net pool) would have to factor in the potential effect of a limited number of trading points restricting the levels of information available, against the ability of a limited number of points to ensure that liquidity is not 'thinned out' over an un-necessarily large number of points. A drawback of the pool model though, is the *ex-post* nature of prices derived to clear the market.

The ability of the New Zealand market to generate enough liquidity in trading to support even a net pool model must be factored against the pro's and cons of a bilateral model that can produce efficient prices and investment, but which also requires a certain level of trading and the free and low cost exchange of information between participants.

Formal Market Operation

In the overseas markets examined, spot markets emerged at points rather than always requiring the formal creation of a market structure. In the United Kingdom for example, spot markets emerged at onshore terminals where gas was delivered from offshore fields. In the United States trading hubs developed from vibrant trading at points where many shippers with capacity to ship gas to a point trade with shippers holding capacity away from that same point. We need to consider the benefits of formally operating a market as opposed to the view that if a market is required it should develop naturally as long as the conditions are right i.e. a large enough trading base, low transaction costs etc. The existing short term trading that does occur appears to be confined to a relatively small number of key points.

Information

While information was mentioned briefly above, its management in international markets varies in different jurisdictions. The On-system trading and OCM markets in the United Kingdom allow information on prices and capacity to be available to market participants, whereas the Victorian and United States markets operate bill-boards for the exchange of information. The level of availability of information in New Zealand is probably analogous to the Australian states other than Victoria. In both instances the dominance of bilateral contracts (both for trading gas and contracting capacity) mean that the level of information available to third parties is minimal and clearly asymmetric in terms of the effect on contract negotiations.

There are clear benefits to the market from having a low cost information exchange process; however the appropriate vehicle for accessing and maintaining these information flows is less unambiguous.

The development of the New Zealand market also needs to consider the consequences of increased information exchange amongst parties, given that in such a small market parties are unlikely to want to voluntarily supply information.

Allocation of Risk

We noted above the increased desire for risk mitigation in the New Zealand market, given the potential shortfalls of gas supply in the longer term. Anecdotal evidence already suggests that new contracts for gas are becoming less flexible in terms of off-take, given the lack of flexible gas available as we move toward a post-Maui era.

In the United States, the dominance of bilateral contracts does not necessarily imply an asymmetric attribution of risk. The number of suppliers in the market is large enough to limit the ability of a supplier to dictate terms and conditions to a certain extent.

In the United Kingdom, spot market trading has resulted in standardization of contracts and conditions for spot and On-system trading ensuring that risk is not unreasonably inequitable.

New Zealand market development will have to determine what allocation of risk is most efficient for the particular trading mechanism selected.

Balancing

Regardless of the particular trading mechanism, the onus for balancing a shipper's position is typically up to the shipper – even though the pipeline owner is usually ultimately responsible for physical balance of the pipeline.

All the international markets exhibited fairly formal balancing mechanisms, particularly where there was a limited ability to correct for imbalance through linepack (as is the case for imbalances outside of the gas day in New Zealand). The market in the United States deals with balance through the contracts themselves, but its applicability to New Zealand is limited, given the availability of relatively large amounts of linepack. The determination of clearing prices for imbalances in a spot market setting seemed to create useful incentives for shippers to balance their injections and withdrawals effectively.

The periods for correcting imbalances varied from daily to monthly, but daily managed was more prevalent. It was common for imbalances to be charged for outside of set tolerances given that some level of imbalance is not unusual.

Sources:

- **ABARE (Australian Bureau of Agricultural and Resource Economics)**: *Australian Gas Markets, moving towards maturity.* December 2003.
- **Charles River Associates:** *The Implications for Governance of the Distinctions Between Gas and Electricity.* January 2004.
- **ICF Consulting:** *Review of Overseas Gas Markets.* September 2003.
- **The Allen Consulting Group:** *Options for the development of the Australian wholesale gas market, Final report.* June 2005
- **VENCorp (Victorian Energy Networks Corporation)**: *VENCorp's Guide to the Gas Market.* Published via http://www.vencorp.com.au
- http://www.abareconomics.com/data_services/energy.html (noted in the paper as ABARE, 2005)
- http://www.igu.org/members/developm_2003/Singapore.pdf